

BULLETINS
OF THE
Zoological Society of San Diego

No. 16

A Key to the Snakes of the
United States

By C. B. PERKINS

In Charge of Reptiles, Zoological Society of San Diego



SAN DIEGO, CALIFORNIA

JUNE 10, 1940



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CONTENTS

Introduction 5

A List of the Snakes of the United States..... 6

Use of Key 13

Generic Key 14

Key to Each Genus (Alphabetically Arranged)..... 21

Drawings Showing Scale Nomenclature..... 56

Glossary 58

Index 61

INTRODUCTION

Any key to the snakes of the United States or any large area containing a great number of genera must, of necessity, be a compilation, as no single individual has worked on more than a few genera. Such is the case with the present key. The reason for its publication is to place in convenient form a key, as nearly up-to-date as possible, covering all of the snakes in the United States.

Blanchard's *A Key to the Snakes of the United States, Canada and Lower California*, 1925, has been used as a foundation.

Correct taxonomic arrangement has been abandoned for the sake of convenience.

The keys to several genera were written by others, in which case the name of the author and publication data accompany this key. These keys have been adapted to the present key and cut down to include only those snakes found in the United States.

There is such a great deal of variation in scalation, color, and pattern, both geographically and individually, among snakes of the same subspecies, that an occasional error will be made, but it is believed that most specimens will be run down correctly. In questionable cases, location is often a very important factor.

Mr. Norman C. Bilderback prepared the line drawings, including those showing *Crotalus* and *Sistrurus*, which originally appeared in Klauber's *Key to the Rattlesnakes*. The lettering on the drawings was done by Mr. Leslie C. Kobler.

I am deeply indebted to the following for the use of keys, advice, and criticism: Charles M. Bogert of the American Museum of Natural History; Dr. William M. Clay of the University of Louisville; Henry S. Fitch of the U. S. Biological Survey; Dr. Eugene S. McCartney of the University of Michigan; Charles E. Shaw of San Diego; William H. Stickel of the University of Michigan.

Especially am I grateful to Mr. L. M. Klauber, who gave generously of his time in reading the manuscript. Any errors, however, are mine.

C. B. PERKINS.

A List of the Snakes of the United States

FAMILY *Leptotyphlopidae*

- GENUS *Leptotyphlops*
 dulcis dulcis
 dissectus
 humilis humilis
 cahuilae
 segregus
 utahensis

FAMILY *Boidae*

- GENUS *Lichanura*
 roseofusca roseofusca
 gracia
- GENUS *Charina*
 bottae

FAMILY *Colubridae*

- GENUS *Carphophis*
 amoena amoena
 helenae
 vermis
- GENUS *Abastor*
 erythrogrammus
- GENUS *Farancia*
 abacura abacura
 reinwardtii
- GENUS *Diadophis*
 amabilis amabilis
 modestus
 occidentalis
 pulchellus
 similis
 vandenburghi
 punctatus punctatus
 arnyi
 edwardsii
 stictogenys
 regalis regalis
 arizonae
- GENUS *Rhadinaea*
 flavilata
- GENUS *Heterodon*
 contortrix contortrix
 browni
 nasicus nasicus
 kennerlyi
 simus

FAMILY *Colubridae* (continued)

- GENUS *Ophcodrys*
aestivus
vernalis
- GENUS *Coluber*
constrictor constrictor
flaviventris
mormon
priapus
flagellum flagellum
flavigularis
frenatum
lateralis
piceus
semilineatus
taeniatus taeniatus
girardi
ruthveni
schotti
- GENUS *Drymobius*
margaritiferus
- GENUS *Drymarchon*
corais couperi
melanurus
- GENUS *Salvadora*
grahamiae grahamiae
hexalepis
virgultea
- GENUS *Phyllorhynchus*
brozoni brozoni
lucidus
decurtatus nubilus
perkinsi
- GENUS *Elaphe*
bairdi
chlorosoma
guttata
lacta
obsoleta obsoleta
confinis
quadrivittata quadrivittata
deckerti
rosacea
subocularis
vulpina
- GENUS *Arizona*
elegans elegans
occidentalis

FAMILY *Colubridae* (continued)GENUS *Pituophis*

catenifer catenifer
 annectens
 deserticola
deppei deppei
lödingi
melanoleucus
mugitus
ruthveni
sayi sayi
 affinis

GENUS *Lampropeltis*

alterna
calligaster
elapsoides elapsoides
 virginiana
getulus getulus
 boylii
 brooksi
 californiae
 floridana
 holbrooki
 nigra
 splendida
 yumensis
multicincta
pyromelana
rhombomaculata
triangulum triangulum
 amaura
 annulata
 gentilis
 sympila

GENUS *Stilosoma*

extenuatum

GENUS *Cemophora*

coccinea

GENUS *Rhinocheilus*

lecontei

GENUS *Contia*

tenuis

FAMILY *Colubridae* (continued)

- GENUS *Sonora*
episcopa
miniata miniata
linearis
occipitalis
semiannulata semiannulata
blanchardi
gloydi
taylori
- GENUS *Ficimia*
cana
streckeri
- GENUS *Chilomeniscus*
cinctus
- GENUS *Natrix*
cyclopion cyclopion
floridana
erythrogaster erythrogaster
transversa
grahamii
kirtlandii
rhombifera rhombifera
rigida
septemvittata
sipedon sipedon
clarkii
compressicauda
confluens
fasciata
insularum
pictiventris
pleuralis
taxispilota
- GENUS *Seminatrix*
pygaea
- GENUS *Storeria*
dekayi
occipitomaculata
victa
- GENUS *Haldea*
striatula
valeriae valeriae
elegans

FAMILY *Colubridae* (continued)GENUS *Liodytes*
*alleni*GENUS *Thamnophis*
angustirostris
butleri
eques
hammondi
marcianus
megalops
ordinoides ordinoides
atratus
biscutatus
couchii
elegans
hydrophila
vagrans
radix
sauritus sauritus
proximus
sackenii
sirtalis sirtalis
concinus
infernalis
parietalis
pickeringii
*tetrataenia*GENUS *Tropidoclonion*
*lineatum*GENUS *Coniophanes*
*imperialis imperialis*GENUS *Oxybelis*
*microphthalmus*GENUS *Leptodeira*
*septentrionalis septentrionalis*GENUS *Hypsiglena*
*ochrorhynchus*GENUS *Trimorphodon*
lyrophanes
vandenburghi
vilkinsonii

FAMILY *Colubridae* (continued)

GENUS *Tantilla*

atriceps
coronata coronata
wagneri
eiseni
gracilis
kirnia
nigriceps
utahensis
wilcoxi

FAMILY *Elapidae*

GENUS *Micrurus*

fulvius fulvius
barbouri
tenere

GENUS *Micruroides*

euryxanthus

FAMILY *Crotalidae*

GENUS: *Agkistrodon*

mokasen mokasen
cupreus
laticinctus
piscivorus

GENUS *Sistrurus*

catenatus catenatus
tergeminus
miliarius miliarius
barbouri
streckeri

FAMILY *Crotalidae* (continued)GENUS *Crotalus*

adamanteus
atrox
cerastes
horridus horridus
atricaudatus
lepidus lepidus
klauberi
mittelli pyrrhus
stephensi
molossus molossus
ruber
scutulatus scutulatus
tigris
triseriatus pricei
viridis viridis
abyssus
decolor
lutosus
nuntius
oreganus
willardi

USE OF KEY

This key must be started at the beginning unless the generic name of the snake in question is known. Start with No. 1, which gives two choices; take the correct alternative and proceed to the number which is given at the right; continue in the same manner until the generic name of the snake in question is given. A key to that genus will be found on the page whose number is given after the generic name.

The keys to the various genera are arranged alphabetically starting at page 21. Where there is but one snake in a genus, its name and range will be found in its alphabetical position.

The ranges are in parentheses below the name of the snake, and in some cases were taken from the Check List.*

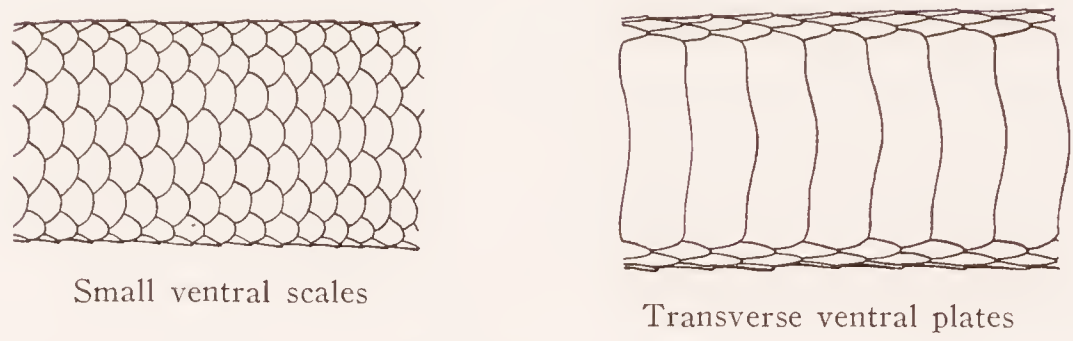
Line drawings with scale nomenclature will be found at page 56.

Technical terms are defined in the glossary, page 58.

* A Check List of North American Amphibians and Reptiles by Leonhard Stejneger and Thomas Barbour; fourth edition, 1939.

GENERIC KEY

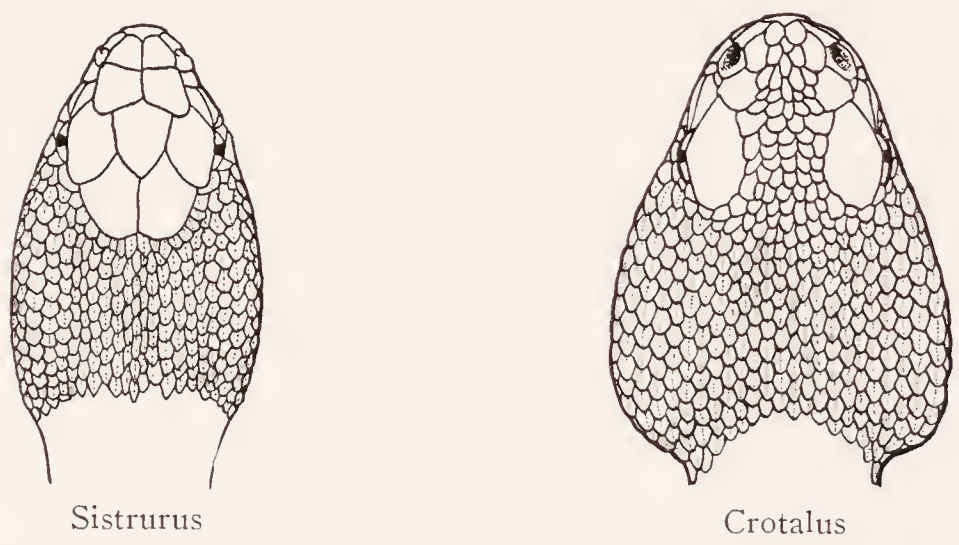
1. Ventral scales same size as dorsal...*Leptotyphlops*...Page 39
- Ventral scales larger than dorsal and elongated transversely 2



2. Deep pit between nostril and eye..... 3
- No pit 5

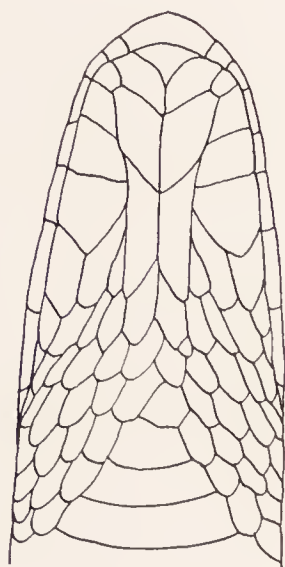


3. Rattle on end of tail..... 4
- No rattle*Agkistrodon*...Page 21

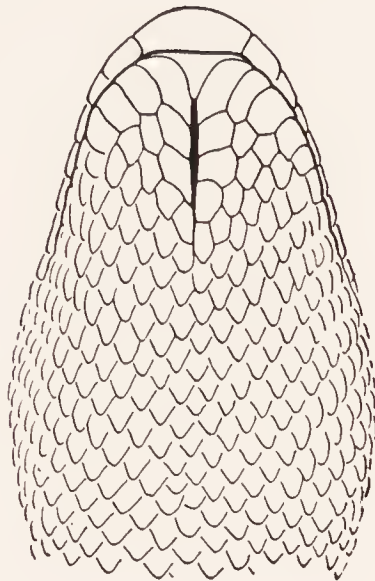


4. Top of head with large plates, including a pair of large, symmetrical parietals in contact.....*Sistrurus*...Page 47

Top of head with scales of varying size; parietals, if enlarged, not in contact, nor symmetrical. . . *Crotalus* . . . Page 25

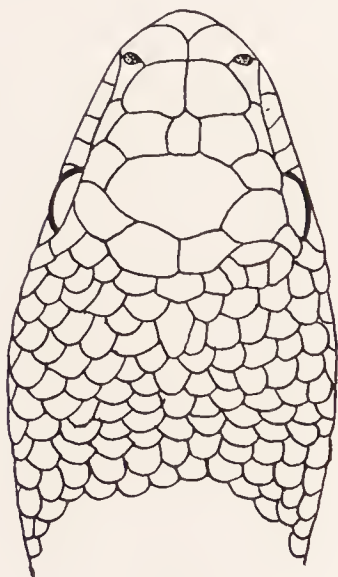


Chin-Shields

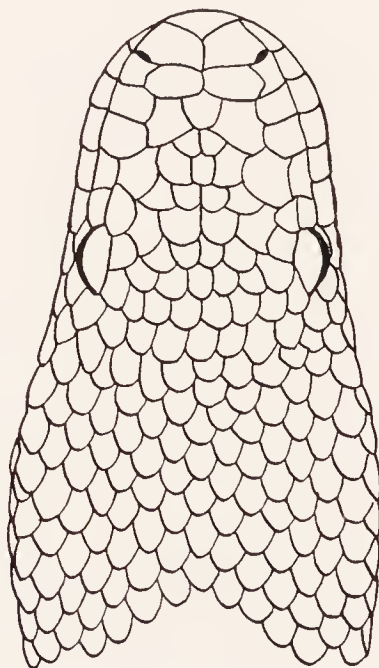


No Chin-Shields

5. One or two pairs of enlarged, elongated chin-shields between the lower labials. 7
Scales between lower labials all small. 6



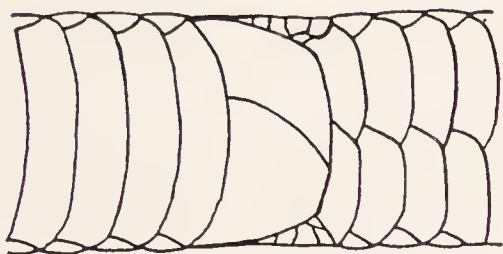
Charina



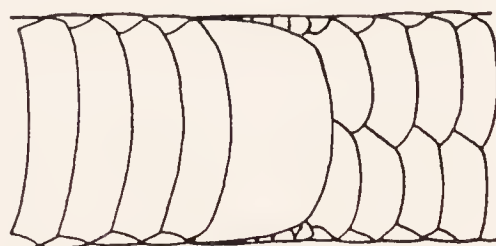
Lichanura

6. A large plate on top of head between the supraoculars.
 Charina . . . Page 22
Small scales on top of head between the supraoculars.
 Lichanura . . . Page 40

17. More than 100 caudals 18
Less than 50 caudals.....*Seminatrix*...Page 47
18. 7 upper labials; 7 or 8 lower labials; dorsal color grass-green*Opheodrys*...Page 44
9 upper labials; 10 or 11 lower labials; dorsal color dark with a light spot on each scale.....*Drymobius*...Page 32
19. 3 postoculars*Natrix*...Page 41
2 postoculars 20
20. 19 or 23 scale rows; scales strongly keeled..*Natrix*...Page 41
25 to 33 scale rows; scales weakly keeled...*Elaphe*...Page 32
21. 29 or more scale rows.....*Pituophis*...Page 45
Less than 29 scale rows..... 22
22. No suboculars (upper labials in contact with eye); rostral normal 23
Suboculars present; rostral very large (with free lateral edges), separating internasals and in contact with prefrontals*Phyllorhynchus*...Page 44
23. 8 or more lower labials.....*Thamnophis*...Page 51
Less than 8 lower labials..... 24
24. A double row of black belly spots..*Tropidoclonion*...Page 55
No belly spots*Haldea*...Page 34

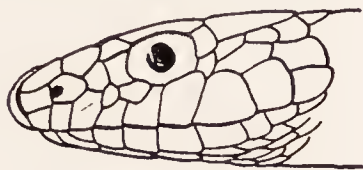


Anal plate divided

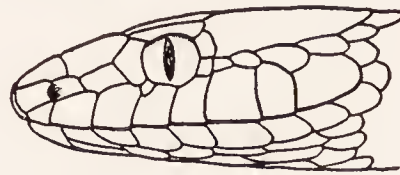


Anal plate not divided

25. Anal plate divided 33
Anal plate not divided 26
26. All or most caudals divided 27
Most caudals entire.....*Rhinocheilus*...Page 46



Round pupil

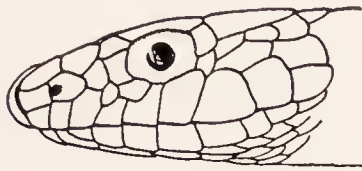


Elliptical pupil

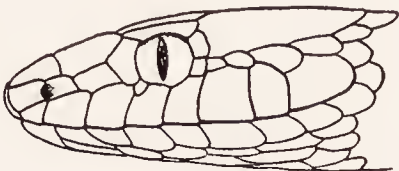
27. Pupil of eye round 29
Pupil elliptical 28

28.	Suboculars present	<i>Phyllorhynchus</i> . . .	Page 44
	No suboculars (upper labials in contact with eye)	<i>Trimorphodon</i> . . .	Page 55
29.	Loreal present		30
	No loreal	<i>Stilosoma</i> . . .	Page 49
30.	Ventral surface light without markings		31
	Ventral surface with at least some dark markings		32
31.	6 upper labials; 8 lower labials	<i>Cemophora</i> . . .	Page 22
	8 upper labials; 12 to 15 lower labials	<i>Arizona</i> . . .	Page 22
32.	17 scale rows	<i>Drymarchon</i> . . .	Page 31
	More than 17 scale rows	<i>Lampropeltis</i> . . .	Page 35
33.	Less than 19 scale rows		34
	19 or more scale rows		50
34.	Loreal present		35
	No loreal		45
35.	1 or more preoculars		37
	No preoculars; loreal and prefrontal in contact with eye		36
36.	13 scale rows; nasal plate entire; 5 upper labials	<i>Carphophis</i> . . .	Page 22
	More than 13 scale rows; nasal plate divided; 6 upper labials	<i>Haldea</i> . . .	Page 34
37.	2 or 3 preoculars		38
	1 preocular		41
38.	Rostral normal		39
	Rostral much enlarged with free lateral edges.	<i>Salvadora</i> . . .	Page 46
39.	2 or 3 anterior temporals (usually); lower preocular very small, wedged between the adjacent upper labials.	<i>Coluber</i> . . .	Page 23
	1 anterior temporal; lower preocular not wedged between upper labials		40
40.	Dorsal color not grass-green; usually a ring on the neck; nasal plate divided	<i>Diadophis</i> . . .	Page 29
	Dorsal color grass-green; no ring; nasal plate entire.	<i>Opheodrys</i> . . .	Page 44
41.	17 scale rows		44
	Less than 17 scale rows		42
42.	Posterior chin-shields about as long as anterior chin-shields; caudals more than 65	<i>Opheodrys</i> . . .	Page 44
	Posterior chin-shields much shorter than anterior chin-shields; caudals less than 65		43

43. Ventral surface uniform light color, or, if any dark markings, they are black rings that encircle the body; no lateral light stripe on the 4th or 5th row of scales.
Sonora...Page 48
Each ventral with a black anterior border; usually a light stripe on the 4th or 5th row of scales....*Contia*...Page 25
44. More than 60 caudals; a dark line from the rostral through the eye to the last upper labial; 7 upper labials.
Rhadinaea...Page 46
Less than 60 caudals; no dark line from the rostral to the last upper labial; usually 8 upper labials.
Seminatrix...Page 47
45. More than 13 scale rows..... 46
13 scale rows*Chilomeniscus*...Page 23
46. 15 scale rows; nose normal..... 48
17 scale rows; nose sharp..... 47
47. Rostral acute and turned up at tip; tail short and thick.
Ficimia...Page 33
Head long and nose sharp; tail long and slender (more than half the body).....*Oxybelis*...Page 44
48. Coloration above uniform except near head; ventrals less than 190*Tantilla*...Page 50
Coloration* consists of rings of black, yellow, and red; ventrals more than 200..... 49
49. Only 1 pair of chin-shields, the anterior ones being replaced by the enlarged first pair of lower labials.
Micruroides...Page 40
2 pairs of chin-shields.....*Micrurus*...Page 40
50. 1 or more preoculars 51
No preoculars (loreal in contact with eye)..... 53



Round pupil



Elliptical pupil

51. Pupil of eye round 52
Pupil elliptical 54

* Gloyd in Herpetologica Vol. 1, No. 5, 1938, records the capture of a melanistic specimen of *Micrurus* at Victoria, Texas.

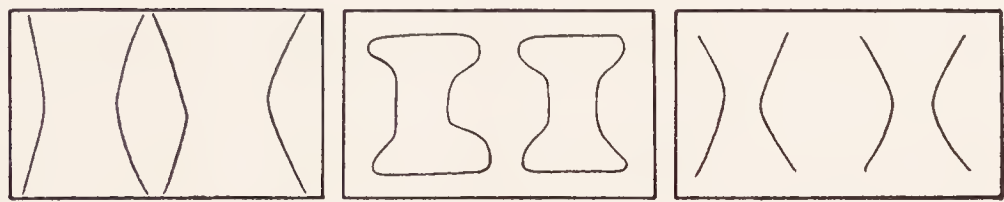
52. 25 to 33 scale rows.....*Elaphe*...Page 32
19 scale rows.....*Coniophanes*...Page 25
53. Longitudinal stripes present.....*Abastor*...Page 21
No stripes*Farancia*...Page 33
54. 1 loreal; 2 postoculars; 1 anterior temporal; 8 upper labials.. 55
2 or more loreals; 3 or 4 postoculars; 2 or 3 anterior tempo-
rals; usually 9 or more upper labials.
Trimorphodon...Page 55
55. Dorsal pattern consists of small blotches with one or two
series of smaller alternating spots on the sides; one large
dark blotch on each side of neck*Hypsiglena*...Page 35
Dorsal pattern consists of 22 to 26 large blotches with no
alternating lateral spots.....*Leptodeira*...Page 39

GENUS *Abastor*

Abastor erythrogrammus (Latreille)
Rainbow snake.
(Charles County, Maryland, southward to Florida and Alabama.)

GENUS *Agkistrodon*

1. Loreal present; no post-parietals; upper labials not in contact with eye; scale rows usually 23.....Copperhead.... 2
- No loreal; a pair of post-parietals; upper labials in contact with eye; scale rows usually 25.....Water moccasin, Cotton mouth.....*Agkistrodon piscivorus* (Lacépède)
(Dismal Swamp, Virginia to Florida and the Gulf States, and Arkansas to Illinois.)



Very little constriction Spool-shaped Hour-glass-shaped

2. Dark dorsal cross-bands show very little constriction; cross-bands 4 to 8 scales wide at the midline.
Agkistrodon mokasen laticinctus Gloyd and Conant
(Western and central Texas, western and central Oklahoma, north to Cowley County, Kansas.)
- Dark dorsal cross-bands show considerable constriction at the midline 3
3. Dark cross-bands are spool-shaped and 3 to 5 scales wide midline.....*Agkistrodon mokasen cupreus* (Rafinesque)
(Eastern Oklahoma and eastern Kansas; parts of Arkansas and Missouri, north to Central Illinois, central Indiana and parts of Ohio, Pennsylvania and New York; Appalachian highlands, from the Tennessee River and north-eastern Alabama, to eastern Massachusetts.)
- Bands are hour-glass-shaped and 2 or 3 scales wide at midline.....*Agkistrodon mokasen mokasen* Beauvois
(Atlantic coastal plain and lower Piedmont areas of Georgia and the Carolinas, exclusive of peninsular Florida.)

GENUS *Arizona*

1. 29 or 31 scale rows; squarish dorsal blotches, usually less than 56; lateral blotches distinct and roundish.

Arizona elegans elegans Kennicott

(Southwestern Kansas, southward through central Texas, westward to southeastern Arizona.)

- 27 scale rows (seldom 29); narrow dorsal blotches, usually more than 56; lateral blotches indistinct and narrow.

Arizona elegans occidentalis Blanchard

(Arizona, extreme southwestern Utah, southern Nevada, southern California and Lower California.)

 GENUS *Carphophis**

1. Color above generally brown; light color of belly extending to 1st or 2nd row of scales..... 2

Color above generally gray or black; light color extending to 3rd scale row..... *Carphophis amoena vermis* (Kennicott)

(Southern Iowa, southeastern Nebraska; eastern Kansas, Oklahoma and Texas; Missouri, Arkansas, Louisiana.)

2. Internasals and prefrontals usually separate.

Carphophis amoena amoena (Say)

(Connecticut to New York, south to central Florida, and west into the Appalachian Mountains.)

Internasals and prefrontals usually united forming two large shields..... *Carphophis amoena helenae* (Kennicott)

(Central Illinois south to Mississippi, east to northwestern Alabama, the Tennessee Valley to eastern Tennessee, West Virginia and eastern Ohio.)

 GENUS *Cemophora*

Cemophora coccinea (Blumenbach)

(Southern New Jersey to Alabama, Louisiana, Oklahoma and Florida.)

 GENUS *Charina*

Charina bottae (Blainville)

Rubber snake.

(Humid districts of California south to the San Jacinto Mountains, Nevada, Idaho, Oregon and Washington, east to Montana, Wyoming and Utah.)

* Snakes of this genus are commonly called Worm snakes.

GENUS *Chilomeniscus*

Chilomeniscus cinctus Cope.

(Central and southwestern Arizona, to northwestern Mexico and central Lower California. One specimen each from Inyo County and Ft. Yuma, California.)

GENUS *Coluber**

- 1. Scale rows at posterior end of body 15 (scale formula 17-15 or 15-15)..... 2
Scale rows at posterior end of body 13 or 11 (scale formula 17-13, 15-13, or 15-11)..... 5
- 2. Dorsal surface black or very dark gray; belly dark gray; caudals average 106. (Juveniles are blotched; under surface of lower jaw not marked with spots.)..... 3
Dorsal surface not black or very dark gray; belly light bluish, greenish, or yellow; caudals usually less than 100..... 4
- 3. Some of the proximal spines of the hemipenes much enlarged into basal hooks.

Coluber constrictor priapus Dunn and Wood†
(Florida.)

Proximal spines of hemipenes not enlarged into basal hooks.

Coluber constrictor constrictor Linné†
(Eastern United States, west to central Indiana, thence southwest through southern Illinois and eastern parts of Missouri, Arkansas, and Texas.)
- 4. 7 upper labials; caudals usually less than 85; color above blue-gray or bluish. (Juveniles are blotched; under surface of lower jaw not marked with spots.)

Coluber constrictor flaviventris Say
(From Rocky Mountains east through Texas, western Arkansas, Missouri and Michigan, and northern parts of Illinois, Indiana and Ohio.)

Upper labials usually 8; caudals usually more than 85; color above olive-brown, greenish, or blue-gray. (Juveniles are blotched; under surface of lower jaw not marked with spots).....*Coluber constrictor mormon* Baird and Girard
(California, Oregon, Washington, Montana, Idaho, Nevada and Utah.)
- 5. 15 scale rows 6
17 scale rows 9
- 6. Head plates with light edges..... 8
Head unicolor 7

* Snakes of this genus are commonly called Racers and Whip snakes.
† If unable to use this internal diagnostic characteristic, separate these two subspecies by their ranges.

7. 2 to 4 dark and 2 light lateral stripes.
Coluber taeniatus schotti (Baird and Girard)
 (Southern Texas and northeastern Mexico.)
 One or no light lateral stripe.
Coluber taeniatus ruthveni (Ortenburger)
 (Southern Texas and Tamaulipas, Mexico.)
8. One or more light cross-bands just behind head or on neck
 and body *Coluber taeniatus girardi* Stejneger and Barbour
 (Central and western Texas southward to Zacatecas,
 Mexico.)
 No light cross-bands just behind head or on neck and body.
Coluber taeniatus taeniatus (Hallowell)
 (Southeastern Oregon, southern Idaho, Nevada and Utah,
 southward to western Texas, New Mexico, Arizona, and
 California east of the Sierra Nevada.)
9. Distinct longitudinal stripes present 10
 No distinct longitudinal stripes 11
10. 2 or 3 light lateral stripes anteriorly, not continued to the
 tail *Coluber semilineatus* (Cope)
 (Central and southeastern Arizona, extreme southwestern
 New Mexico, and south into Sonora.)
 One light lateral stripe, continuing to the tail.
Coluber lateralis (Hallowell)
 (California and Lower California.)
11. Entire dorsal surface of body and tail black. (Juvenile col-
 oration unknown) *Coluber piceus* (Cope)
 (Southeastern Arizona and Lower California, just enter-
 ing extreme southern San Diego County, California.)
 Entire dorsal surface not black 12
12. Black or dark brown cross-bands across the neck or anterior
 fifth of body 14
 No such black or dark brown cross-bands 13
13. Head and anterior portion of body very dark brown, grad-
 ually becoming much lighter posteriorly.
Coluber flagellum flagellum Shaw
 (North Carolina to Florida, westward to eastern Texas
 and central Kansas.)
 Anterior portion of body not darker than posterior.
Coluber flagellum flavigularis (Hallowell)
 (Western Kansas, southeastern Colorado south to central
 Mexico.)
14. A distinct horizontal white stripe, bordered by black, through
 loreal. (Juveniles are blotched; under surface of lower
 jaw spotted.) *Coluber flagellum frenatum* (Stejneger)

- (Central and southern California, Lower California, Nevada, Utah, Arizona, western New Mexico, and Sonora to Sinaloa, Mexico.)
- No distinct horizontal white stripe through loreal..... 15
15. Dark brown cross-bands on neck separated by 1 or 2 scales of lighter brown; most of last upper labial cream color—
Juvenile *Coluber flagellum flagellum* Shaw
(North Carolina to Florida, westward to eastern Texas and central Kansas.)
- Dark brown cross-bands on neck separated by 3 or more scales of lighter brown; all but anterior lower corner of last upper labial brown—Juvenile.
Coluber flagellum flavigularis (Hallowell)
(Western Kansas, southeastern Colorado south to central Mexico.)

GENUS *Coniophanes*

- Coniophanes imperialis imperialis* (Baird)
(Southern Texas to Vera Cruz, Mexico.)

GENUS *Contia*

- Contia tenuis* (Baird and Girard)
(Puget Sound to south central California.)

GENUS *Crotalus**

1. Outer edges of supraoculars extended into raised and flexible hornlike processes distinctly pointed at the tip—Sidewinder
Crotalus cerastes Hallowell
(Deserts of the southwestern United States and northwestern Mexico.)
- Outer edges of supraoculars not extended into raised and flexible hornlike processes..... 2
2. Tip of snout and canthus rostralis raised into a sharp ridge, by bending up of the outer edges of internasals and canthals; rostral and mental marked vertically by a narrow, light line on a red-brown ground..... *Crotalus willardi* Meek
(Southern Arizona to Zacatecas, Mexico.)
- Tip of snout and canthus rostralis not raised into a sharp ridge; no central light line on rostral and mental..... 3

* Adapted from L. M. Klauber, A Key to the Rattlesnakes with Summary of Characteristics; Trans. S. D. Soc. Nat. Hist., Vol. 8, No. 20, 1936.

3. Upper preocular split vertically, the anterior section being higher than the posterior and curved over the canthus rostralis in front of the supraocular; prenasal curved under the postnasal; usually a dorsal pattern of widely separated crossbars 4

Upper preocular not split vertically; or, if split, the anterior section not conspicuously higher than the posterior and not curved over the canthus rostralis in front of the supraocular; prenasal not curved under the postnasal; the pattern not of widely separated crossbars or rings..... 5
4. A dark stripe passing backward from the eye to the angle of the mouth; dorsal pattern of crossbars often not strongly differentiated from the ground color; ventral surface mottled *Crotalus lepidus lepidus* (Kennicott) (West Texas south to northern San Luis Potosí, Mexico.)

No dark postocular stripe; dorsal pattern of crossbars sharply contrasting with the ground color; ventral surface punctated..... *Crotalus lepidus klauberi* Gloyd (Mountains of southern Arizona, Southern New Mexico, and extreme west Texas south to Jalisco, Mexico.)
5. Prenasals in contact with rostral; upper preocular not divided, or if divided the loreal conspicuously longer than high 6

Prenasals usually separated from the rostral by small scales or granules; upper preoculars often divided, horizontally, vertically, or both..... *Crotalus mitchellii pyrrhus* (Cope) (Southern California, southern Nevada, western Arizona, and northern Lower California.)
6. Tail of alternating black, and light ash-gray rings, both colors being in sharp contrast with the posterior body color, which may be gray, dark-gray, cream, pink, red, red-brown, or olive-brown 7

Tail not of alternating black, and light ash-gray rings in strong color-contrast to the body color immediately anterior to the tail..... 9
7. Dark and light tail rings of approximately equal width; postocular light stripe, if present, intersects the upper labials from 1 to 3 scales anterior to the angle of the mouth; minimum scales between supraoculars 3 or more; no definite line of demarcation between the scales in the frontal and prefrontal areas; proximal rattle black..... 8

Dark tail rings narrower than light; postocular light stripe, if present, passes backward above the angle of the mouth; minimum scales between the supraoculars rarely more than 2; a definite division line or suture between the scales in the

frontal and prefrontal areas; lower half of proximal rattle light in color....*Crotalus scutulatus scutulatus* (Kennicott) (Southeastern California to west Texas, and south to the central Mexican plateau.)

8. First lower labials usually not divided transversely; general color cream, buff, gray, or gray-brown (sometimes pink or red in central Arizona or New Mexico); dark punctations conspicuous in marking.....*Crotalus atrox* Baird and Girard (Arkansas to southeastern California and south to San Luis Potosí, Mexico. Accidentally introduced in Vernon County, Wisconsin.)

First lower labials usually divided transversely; general color pink, red, brick-red, or red-brown; dark punctations weakly in evidence or absent from markings...*Crotalus ruber* Cope (Coastal southern California, and northern and central Lower California.)

9. Two internasals 15
More than two internasals in contact with rostral, regardless of size or position 10
10. Light postocular stripe 1 or 1½ scales wide and clearly outlined; body blotches commonly subrectangular, with even edges and usually with a narrow light border..... 11
Light postocular stripe 2 or more scales wide, often indefinite or absent; body blotches, if in evidence, commonly diamonds, or ellipses, or if rectangles, with edges rough or serrated, and often without narrow light borders..... 12
11. Color usually green or olive-green; less often olive-brown or brown; scale-rows 27 or 25; dorsal scale rows at the center of the tail 13 or more; adult size exceeding 850 mm.
Crotalus viridis viridis (Rafinesque)
(Western Great Plains from Alberta and Saskatchewan to extreme northern Mexico.)
Color pink, red, or red-brown; scale rows 25 or 23; dorsal scales at the center of the tail 12 or less; adult size rarely exceeding 650 mm.....*Crotalus viridis nuntius* Klauber (Northeastern Arizona.)
12. Color straw, cream, or yellow; blotches often only faintly in evidence or obsolete in adults; adult size smaller, usually under 650 mm.....*Crotalus viridis decolor* Klauber (Eastern Utah and western Colorado.)
Color darker, not straw, cream, or yellow; adult size larger, over 650 mm. 13
13. Adult color vermilion or salmon; body blotches tending toward obsolescence in adults...*Crotalus viridis abyssus* Klauber (Grand Canyon of Arizona.)

- Adult color other than vermilion or salmon; body blotches in evidence, or body black 14
14. Ground color lighter, usually buff or drab; body blotches occupy less or but little more longitudinal space than interspaces; secondary series of lateral blotches little in evidence; a pattern of dark-brown dorsal blotches (often with light centers) on a buff or drab ground color.
Crotalus viridis lutosus Klauber
 (The Great Basin between the Rockies and the Sierra Nevada.)
 Ground color darker, usually dark-gray, olive, brown, or black; dark-brown or black dorsal blotches (usually diamonds or hexagons) occupying considerably more longitudinal space than the interspaces; a secondary series of lateral blotches conspicuously in evidence. Some mountain specimens nearly uniform black, only patches of yellow scales representing the interspaces on the mid-dorsal line.
Crotalus viridis oreganus Holbrook
 (Pacific Coast from British Columbia to central Lower California. Also mountains of Arizona and extreme west central New Mexico.)
15. A vertical light line on the posterior edge of the prenasals and first upper labials.....*Crotalus adamanteus* Beauvois
 (Coastal plains of the southeastern states.)
 No vertical light line on the posterior edge of the prenasals and first upper labials..... 16
16. Supraoculars pitted, sutured, or with outer edges broken.
Crotalus mitchellii stephensi Klauber
 (Southern Nevada and east-central California.)
 Supraoculars not pitted, sutured, nor with broken outer edges 17
17. Head larger; head length contained less than 25 times in adult body length; proximal rattle width contained in head length more than $2\frac{1}{2}$ times 18
 Head notably small for a rattlesnake; head length in adults contained in body length (over-all) 25 times, or more; proximal rattle width contained in head length less than $2\frac{1}{2}$ times.....*Crotalus tigris* Kennicott
 (Southern Arizona, and northern and central Sonora, Mexico.)
18. Usually a definite division between the scales in the frontal and the prefrontal areas; scales in the anterior part of frontal area larger than those behind; anterior body pattern not in chevron-shaped bands or not all black..... 20

- No definite division or continuous suture between the scales in the frontal and the prefrontal areas; scales in the anterior part of frontal area not conspicuously larger than those behind; normal pattern a series of chevron-shaped crossbands sometimes broken, or with the body all black.. 19
19. Dorsal scale rows usually 23; postocular dark stripe indistinct; no middorsal reddish-brown stripe evident anteriorly; sometimes entirely black.
Crotalus horridus horridus Linné
(Eastern United States, Maine to Oklahoma.)
Dorsal scale rows usually 25; postocular dark stripe distinct and in contrast with the ground color; a middorsal reddish-brown or brown stripe evident anteriorly.
Crotalus horridus atricaudatus Latreille
(Coastal plain of South Atlantic and Gulf States; lower Mississippi Valley.)
20. Dorsal pattern consists of two parallel rows of small brown blotches.....*Crotalus triseriatus pricei* Van Denburgh
(Mountains of southeastern Arizona to Durango, Mexico.)
Dorsal pattern consists of a single row of large blotches.... 21
21. Usually a single loreal; tail rings sharply contrasting in color.
Crotalus scutulatus scutulatus (Kennicott)
(Southeastern California to west Texas, and south to the central Mexican plateau.)
Usually two or more loreals; tail often black, or with rings faintly in evidence against a dark background.
Crotalus molossus molossus Baird and Girard
(West Texas to central Arizona and south to northern Durango, Mexico.)

GENUS *Diadophis**

1. Ventral color extending, on anterior portion of body, onto one or more of lowermost rows of dorsal scales; ventrals usually more than 180..... 5
Ventral color not extending onto lowermost row; ventrals usually less than 180..... 2
2. Black spots on belly in a single median row, or nearly or quite absent (very rarely irregular); upper labials usually 8 4
Black spots on belly numerous and scattered or irregular; upper labials 7 (only rarely 8)..... 3

* Snakes of this genus are commonly called Ring-neck snakes.

3. Ventrals in males more than 145, in females more than 150; scale formula 17-17, or 17-15 (occasionally only 15); belly spots scattered or in pairs, generally clean-cut in appearance. *Diadophis punctatus arnyi* Kennicott (Ohio, northern Illinois, Indiana, Kansas, Iowa, South Dakota, Missouri, northwestern Arkansas, Oklahoma, and Texas.)

Ventrals in males less than 145, in females less than 150; scale rows 15; belly spots showing tendency to fuse into a single row, or irregularly massed.

Diadophis punctatus stictogenys Cope
(Southern Illinois, through the lower Mississippi Valley to the Gulf.)

4. Sum of ventrals and caudals usually less than 191; belly with a series of large half-circular black spots along the median line; neck ring usually partially or wholly interrupted on the mid-dorsal line.

Diadophis punctatus punctatus (Linné)
(Southeastern states northward to northern North Carolina.)

Sum of ventrals and caudals usually more than 191; belly usually immaculate, but sometimes with a median series of small black spots, more or less imperfectly developed; neck ring only rarely interrupted on the mid-dorsal line.

Diadophis punctatus edwardsii (Merrem)
(The mountains of the Carolinas through the Appalachians northward to the Northern Peninsula of Michigan, Wisconsin, southern Canada, and the Maritime provinces.)

5. Ventrals in males less than 206; in females less than 220. . . . 7
Ventrals in males more than 206; in females more than 220. . . 6
6. Neck ring 2 to 4 scale lengths in width.

Diadophis regalis arizonae Blanchard
(Central Arizona to northern Sonora, Mexico.)

Neck ring absent, or much reduced.

Diadophis regalis regalis Baird and Girard
(Southern Utah, southeastern Arizona, to central Texas and to the State of Veracruz, Mexico.)

7. Scale formula, 17-15 (rarely 15-15) 8
Scale formula, 15-15 or 15-13 (rarely 17-15 or 15-17-15) . . . 9

8. Ventral color not covering more than $\frac{3}{4}$ of the lowermost row of dorsal scales; belly usually conspicuously spotted with black. . *Diadophis amabilis modestus* Duméril and Bocourt (San Bernardino Mountains, and Los Angeles County, including Santa Catalina Island, south to extreme northern San Diego County, California.)

- Ventral color covering from $1\frac{1}{2}$ to 2 of the lowermost rows of dorsal scales; belly usually only lightly spotted with black.....*Diadophis amabilis vandenburghi* Blanchard (Ventura to Santa Cruz County, California.)
9. Ventral color usually covering more than $\frac{2}{3}$ of the lowermost row of dorsal scales..... 10
- Ventral color covering $\frac{1}{3}$ to $\frac{2}{3}$ of the lowermost row of dorsal scales; neck ring only rarely interrupted; color above usually olive or bluish slate.
Diadophis amabilis similis Blanchard (From southwestern San Bernardino County south into the San Pedro Martir range in Lower California.)
10. Neck ring from 1 to $1\frac{1}{2}$ scale lengths in width, often interrupted; ventral color covering $\frac{1}{2}$ to $1\frac{1}{2}$ rows of dorsal scales; belly well sprinkled with small black spots; dorsal color usually dark.
Diadophis amabilis amabilis Baird and Girard (California, restricted to the regions about San Francisco and the San Joaquin and Sacramento Valleys.)
- Neck ring $1\frac{1}{2}$ to 3 scale lengths in width, not interrupted; ventral color covering from $1\frac{1}{2}$ to 2 or more rows of dorsal scales; belly never heavily spotted with black..... 11
11. Two lowermost rows of dorsal scales flecked with black; belly rather conspicuously, although sparsely, marked with small black dots....*Diadophis amabilis occidentalis* Blanchard (From Sonoma County, California, northward perhaps to the Columbia River.)
- Two lowermost rows of dorsal scales not flecked with black; belly almost or quite unspotted.
Diadophis amabilis pulchellus Baird and Girard (Western slope of the Sierra Nevada, south perhaps to Tejon Pass in California and north perhaps to southern Oregon.)

GENUS *Drymarchon*

1. General color black; upper labial behind eye not in contact with lower anterior temporal. Indigo snake, Gopher snake.....*Drymarchon corais couperi* (Holbrook) (South Carolina to Florida, westward through southern Louisiana into Texas.)
- General color brown but posterior part of body and tail black; upper labial behind eye usually in contact with lower anterior temporal.
Drymarchon corais melanurus (Duméril and Bibron) (Extreme southwestern Texas to northwestern South America.)

GENUS *Drymobius**Drymobius margaritiferus* (Schlegel)

(Southwestern Texas to Venezuela and Colombia.)

GENUS *Elaphe**

1. Suboculars present *Elaphe subocularis* (Brown)
(Extreme southwestern Texas southward to near Saltillo,
Mexico.)
No suboculars (upper labials in contact with eye) 2
2. Upper surface uniform grayish or greenish; uniform whitish
below *Elaphe chlorosoma* (Günther)
(Santa Rita Mountains in Arizona, southward to Guerrero
and Jalisco, Mexico.)
Upper surface dark brown or black, or with blotches or
stripes 3
3. Dorsal pattern consists of 50 or more (usually more) narrow
dark cross-bands separated by wide interspaces.
Elaphe bairdi (Yarrow)
(Davis Mountains in Jeff Davis and Brewster Counties,
Texas; also Coahuila, Mexico.)
Dorsal pattern not of 50 or more narrow dark cross-bands.. 4
4. Neck bands traversing parietals and uniting on frontal..... 5
No neck bands traversing parietals and uniting on frontal.. 7
5. More than 222 ventrals; red in the dorsal coloring..... 6
Less than 222 ventrals; dorsal color gray and brown.
Elaphe laeta (Baird and Girard)
(Utah, Kansas, and Nebraska, southward to central Mex-
ico.)
6. A great deal of black on the yellowish belly. Corn snake.
Elaphe guttata (Linné)
(New Jersey to Florida, to Louisiana and Arkansas.)
No black (or very little) on pinkish belly, *Elaphe rosacea* (Cope)
(The lower Florida Keys.)
7. More than 220 ventrals 8
Less than 220 ventrals. Fox snake.
Elaphe vulpina (Baird and Girard)
(Ohio westward to South Dakota, northward to Minne-
sota, Wisconsin, and Michigan.)
8. Dorsal pattern in adults consists of four longitudinal stripes
(the juveniles are blotched); caudals in males less than
88, in females 63 to 77..... 9

* Snakes of this genus are commonly called Rat snakes and Chicken snakes.

- Dorsal pattern of blotches or uniform black; caudals in males more than 88, females 69 to 95..... 10
9. No (or very indistinct) blotches between the middle stripes.
Elaphe quadrivittata quadrivittata (Holbrook)
 (Eastern North Carolina to Florida and west to the Mississippi River.)
- Distinct blotches between the middle stripes.
Elaphe quadrivittata deckerti Brady
 (The upper Florida Keys.)
10. Color above uniform black or nearly so (the juveniles are blotched); scale rows 25 or 27. Pilot black snake.
Elaphe obsoleta obsoleta (Say)
 (Southern New England westward to Wisconsin, southern Ontario, southward to Texas, Louisiana and Florida.)
- Pattern of readily distinguishable blotches; scale rows 27 or 29.....*Elaphe obsoleta confinis* (Baird and Girard)
 (South Atlantic and Gulf States and states of southern Mississippi Valley.)

GENUS *Farancia**

1. Light bars on the neck separated medially by (usually) 8 or 9 scale rows; light bars on body end abruptly dorsally.
Farancia abacura reinwardtii Schlegel
 (Extreme western Florida northward in the lowlands to southern Indiana and southeastern Missouri; westward along the coast of Texas.)
- Light neck bars separated by no more than 3 or 4 scale rows; light bars on body becoming narrower dorsally and end in a point*Farancia abacura abacura* (Holbrook)
 (Peninsular Florida northward in the coastal regions to Amelia County, Virginia, westward to include extreme eastern Alabama.)

GENUS *Ficimia*

1. Small internasals separated by the rostral, which touches the prefrontals; flecks of brown on posterior part of belly and under tail.....*Ficimia cana* (Cope)
 (Western Texas to Arizona.)
- No internasals; rostral separates the prefrontals and makes a broad contact with the frontal; belly uniform white.
Ficimia streckeri Taylor
 (Extreme southeastern Texas.)

* Snakes of this genus are commonly called Horn snakes.

GENUS *Haldea*

1. 6 upper labials; 2 postoculars (seldom 1 or 3) 2
 5 upper labials; 1 postocular *Haldea striatula* (Linné)
 (Virginia to northern Florida, westward to central Texas,
 Oklahoma and Missouri.)
2. 15 scale rows *Haldea valeriae valeriae* (Baird and Girard)
 (New Jersey to northern Florida, west to Ohio and Ten-
 nessee.)
- 17 scale rows *Haldea valeriae elegans* (Kennicott)
 (Indiana, Illinois and Iowa southward to Texas, eastward
 to southwestern Alabama, and northward to Ohio and
 western Pennsylvania.)

GENUS *Heterodon**

1. Prefrontals in contact; under side of tail generally conspicu-
 ously lighter than abdomen 2
 Prefrontals separated by small scales; underside of tail not
 conspicuously lighter than abdomen 3
2. Internasals separated by a small scale, the azygous; 20 or
 more light cross-bars on body; some specimens nearly
 black above *Heterodon contortrix contortrix* (Linné)
 (New Hampshire to central Florida, westward to Texas
 and Oklahoma and northward through the states of the
 Mississippi basin to Minnesota.)
 Internasals in contact; less than 20 light cross-bars on body.
Heterodon contortrix browni Stejneger
 (Extreme southern Florida.)
3. 23 scale rows; under surface mostly black 4
 25 scale rows (rarely 27); under surface mostly light.
Heterodon simus (Linné)
 (North Carolina southward to central Florida, and north-
 westward to Indiana.)
4. 2 or 3 small scales accessory to the azygous; loreal small or
 absent; under surface black and white spotted.
Heterodon nasicus kennerlyi Kennicott
 (Western Texas, southern New Mexico, southern Arizona
 and northwestern Mexico.)
 8 or more small scales accessory to the azygous; loreals gen-
 erally 2; undersurface nearly all black.
Heterodon nasicus nasicus Baird and Girard
 (Southwestern Iowa, Kansas, Nebraska, and Colorado,
 north to Montana and south to northern Mexico; also
 southeastern Missouri.)

* Snakes of this genus are commonly called Hog-nose snakes and Spread-
 ing adders.

GENUS *Hypsiglena*

Hypsiglena ochrorhynchus Cope.

(Central Washington and Idaho southeastward through southern Utah and southern Colorado to Kansas then southwestward to southwestern Texas and west to California; northwestern Mexico, Lower California and Cedros Island.)

GENUS *Lampropeltis**

1. Pattern of narrow cross-bands of black, the alternate bands mixed or split with red; ground color above slate gray.
Lampropeltis alterna (Brown)
(Davis Mountains, Texas.)
Pattern not of narrow cross-bands of black, the alternate bands mixed with red; ground color above not slate gray.. 2
2. Pattern with red, or with dorsal blotches of brown, gray, or red, with black borders..... 12
Pattern not with red, nor with dorsal blotches of brown, gray, or red, with black borders..... 3
3. Pattern in rings, cross-bands, or stripes, or chiefly of scales white at base shading gradually into a black distal border, but not chiefly of sharply defined white or yellow spots on black scales..... 6
Scales chiefly black with sharply defined white or yellow spots, these spots often so grouped as to form 50 or more narrow cross-bands on body and tail..... 4
4. Usually 21 scale rows at the middle of the body..... 5
Mid-body scale rows 23 or 25; no light centers dorsally on the scales between the cross-bands; head mostly black.
Lampropeltis getulus splendida (Baird and Girard)
(Southeastern Arizona; southern Texas and northern Mexico.)
5. A yellow spot on practically every dorsal scale.
Lampropeltis getulus holbrooki Stejneger
(Western Alabama to Texas, northward through the states of the Mississippi basin mostly west of the river, to southern Iowa, southern Nebraska, and Wyoming.)
Scales between the cross-bands without light centers or with only a very few small ones.
Lampropeltis getulus nigra (Yarrow)
(Northern Alabama, Tennessee, West Virginia, Kentucky, Ohio, and southern Indiana.)

* Snakes of this genus are commonly called King snakes and Milk snakes.

6. Pattern consists of rings, or longitudinal stripes of white or yellowish; posterior chin-shields generally much shorter and narrower than anterior and separated by 1 or 2 small scales 9
 No rings nor stripes; posterior chin-shields nearly as long and nearly as wide as anterior, in contact or separated by not more than 1 small scale..... 7
7. Many dorsal cross-bands of white or yellow..... 8
 No dorsal cross-bands distinguishable; dorsal scales light at base, shading gradually into a dark distal border.
Lampropeltis getulus brooksi Barbour
 (Extreme southern Florida.)
8. Less than 50 cross-bands.. *Lampropeltis getulus getulus* (Linné)
 (Southern New Jersey to northern Florida and southeastern Alabama.)
 More than 50 cross-bands, or nearly indistinguishable.
Lampropeltis getulus floridana Blanchard
 (Florida from Orange County in the north to central Dade County in the southeast.)
9. Pattern of rings 10
 A dorsal longitudinal stripe.
Lampropeltis getulus californiae (Blainville)
 (Southwestern California and Lower California.)
10. White scales white to their bases; white bars on prefrontals broad 11
 White scales mostly brown at their bases; white bars on prefrontals narrow. *Lampropeltis getulus yumensis* Blanchard
 (Southwestern Arizona, California, as far north as Blythe, and as far west as Seeley, and adjacent areas of Sonora, Mexico and Lower California.)
11. If found within the territory where striped or aberrant pattern phases are found.
Lampropeltis getulus californiae (Blainville)*
 (Southern San Joaquin Valley, through southern California, and Lower California.)
 If found outside the territory where striped or aberrant pattern phases are found.
Lampropeltis getulus boylii (Baird and Girard)*
 (California, except San Joaquin Valley and southern California; southern Oregon, Nevada, Utah, and western Arizona.)

* See L. M. Klauber: The California King Snake, a case of pattern dimorphism. *Herpetologica*, Vol. 1, No. 1, July 11, 1936.

Also Klauber: Pattern dimorphism in the California King Snake, *Bull., Zool. Soc. San Diego*, No. 15, 1939.

12. Pattern of black-edged dorsal blotches of brownish or dark red, only narrowly in contact with fifth row of scales, or extending no lower than the sixth or seventh rows..... 13
 Pattern in rings; or if in blotches or saddles of brown, gray, or red, these broadly in contact with the fifth or a lower row of scales 14
13. Scale rows 25 or 27; dorsal blotches have concave anterior and posterior margins; lower labials 9 or 10, rarely 8.
Lampropeltis calligaster (Harlan)
 (Indiana, Illinois, Wisconsin, and southern Iowa; Mississippi, Kansas, Arkansas, Oklahoma and Texas.)
 Scale rows 23 or 21; dorsal blotches with straight or convex anterior and posterior margins; blotches often indistinct; lower labials 8, less often 9.
Lampropeltis rhombomaculata (Holbrook)
 (Maryland to central Florida and part of Alabama.)
14. Whitish cross-bands on body and tail less than 40; or if more than 40, snout not uniformly whitish..... 15
 Whitish cross-bands more than 40; top of head black, snout uniformly white.....*Lampropeltis pyromelana* (Cope)
 (Utah, Arizona, and western New Mexico.)
15. Whitish cross-bands usually distinctly widened on first row of scales, or scale rows anteriorly not more than 17..... 19
 Whitish cross-bands little, if any, widened on the lower rows of scales, and scale rows more than 17 on anterior end of of body 16
16. Whitish rings usually more than 30; snout black.
Lampropeltis multicincta (Yarrow)
 (Oregon, California and Lower California.)
 Whitish rings less than 30..... 17
17. Dorsal red areas usually continuous across the belly; snout whitish, speckled with black.
Lampropeltis triangulum amaura Cope
 (Lower Mississippi Valley, southeastern Oklahoma, and eastern Texas.)
 Spaces on the belly between the yellow rings filled with black; snout totally black or only very slightly lightened on top or sides 18
18. Yellowish rings, 19 to 25; black spaces on the belly usually longer than the intervening yellow ones.
Lampropeltis triangulum annulata Kennicott
 (Southeastern Texas and northeastern Mexico.)

- Yellowish rings usually 25 to 30; black spaces on belly usually shorter than the intervening yellow ones.
Lampropeltis triangulum gentilis (Baird and Girard)
 (Texas and northwestern Mexico; Arizona, Utah, Colorado, to South Dakota.)
19. Black on the head practically restricted to the posterior portion, or to various black-edged light markings..... 21
 Black practically uniform over head except for snout region, which is more or less lightened, at least on the sides..... 20
20. Whitish rings or cross-bands usually 25 to 30.
Lampropeltis triangulum gentilis (Baird and Girard)
 (Texas and northwestern Mexico; Arizona, Utah, Colorado to South Dakota.)
 Whitish rings or cross-bands 18 to 25.
Lampropeltis triangulum amaura Cope
 (Lower Mississippi Valley, southeastern Oklahoma, and eastern Texas.)
21. Usually two anterior temporals; scale formula very rarely lower than 19-21-19-17..... 23
 Usually one anterior temporal; scale formula generally 17-19-17; rarely higher than 19-17..... 22
22. Red areas continuous across the belly.
Lampropeltis elapsoides elapsoides (Holbrook)
 (Kentucky, Tennessee, and North Carolina, southward throughout the southeastern coastal plain, including all of Florida.)
 Red not continuous across the belly but restricted to black-bordered dorsal saddles that extend upon the ventrals.
Lampropeltis elapsoides virginiana Blanchard
 (Northern North Carolina to Delaware, east of the Alleghany Mountains.)
23. Dorsal pattern of saddles, or of blotches of red or brown; whitish cross-bands 23 to 60..... 24
 Dorsal pattern practically rings; whitish cross-bands 18 to 30.
Lampropeltis triangulum amaura Cope
 (Lower Mississippi Valley, southeastern Oklahoma, and eastern Texas.)
24. Dorsal saddles usually more than 35, reaching down to the fifth or third row of scales above the ventrals; often two rows of lateral alternating blotches; a dark band on posterior portion of prefrontals; a black-bordered light band from the eye to the angle of the mouth; usually a Y-shaped light spot on the back of the head.
Lampropeltis triangulum triangulum (Lacépède)

(Eastern North America from Maine through Ontario to Minnesota, south to Iowa and Virginia and in the mountains farther south.)

Dorsal saddles usually less than 35, extending down to the third row of scales, or lower; only one series of alternating spots; head markings of *triangulum* only partially or not at all developed. *Lampropeltis triangulum sypila* (Cope)
(Oklahoma, Arkansas, and Tennessee northward to Kansas, Iowa, Illinois, Indiana, and southern Minnesota.)

GENUS *Leptodeira*

Leptodeira septentrionalis septentrionalis (Kennicott)
(Southern Texas and northeastern Mexico.)

GENUS *Leptotyphlops**

- 1. Supraoculars present 2
No supraoculars 3
- 2. Anterior supralabials entire.
 Leptotyphlops dulcis dulcis (Baird and Girard)
 (Central Oklahoma south through central Texas to north-
 ern Nuevo Leon and Tamaulipas, Mexico.)
Each anterior supralabial divided by a vertical suture.
 Leptotyphlops dulcis dissectus (Cope)
 (Coahuila, Mexico, trans-Pecos Texas, southern New
 Mexico and southeastern Arizona; also southern Kansas
 and northeastern Oklahoma.)
- 3. 10 scale rows around the tail.
 Leptotyphlops humilis segregus Klauber
 (Southeastern Arizona through trans-Pecos and Big-
 Bend, Texas to central Coahuila, Mexico.)
12 scale rows around the tail. 4
- 4. 4th mid-dorsal scale often divided longitudinally; 5th dorsal
 much wider than the 6th; dorsal scales more than 288.
 Leptotyphlops humilis utahensis Tanner
 (Extreme southwestern Utah.)
4th mid-dorsal scale undivided; 5th dorsal not much, if any,
 wider than the 6th; dorsal scales more or less than 288. . . 5

* Adapted from L. M. Klauber: The Worm Snakes of the Genus *Leptotyphlops* in the United States and Northern Mexico. Trans. S. D. Soc. Nat. Hist. Vol. 9, No. 18. April, 1940.

5. 5 lightly pigmented mid-dorsal scale rows; usually 285 or more dorsal scales. . . . *Leptotyphlops humilis cahuilae* Klauber (The Colorado Desert in southeastern California, the Yuma Desert in southwestern Arizona, and Vizcaino Desert in central Lower California.)
- 7 or more heavily or mediumly pigmented mid-dorsal scale rows; usually less than 285 dorsal scales.
Leptotyphlops humilis humilis (Baird and Girard)
 (Central Lower California including Cedros Island north to Santa Barbara, California; the Mojave Desert; from extreme southern Nevada southeasterly to the Tucson area in Arizona.)

GENUS *Lichanura*

1. Stripes (usually poorly defined) have uneven (wavy or mottled) edges. California Boa.
Lichanura roseofusca roseofusca Cope
 (Southwestern California and northern Lower California.)
- Stripes (well defined) have even (but serrated) edges.
 Desert Boa. *Lichanura roseofusca gracia* Klauber
 (Desert regions of southeastern California, northeastern Lower California, southwestern Arizona and western Sonora.)

GENUS *Liodytes*

- Liodytes alleni* (Garman)
 (Florida and the Okefinokee Swamp, Georgia.)

GENUS *Micruroides*

- Micruroides euryxanthus* (Kennicott)
 Coral snake.
 (Southern New Mexico and Arizona, possibly extreme southwestern Utah, northern Mexico and Tiburón Island.)

GENUS *Micrurus**

1. No black on the dorsal scales of the red rings.
Micrurus fulvius barbouri Schmidt
 (Extreme southern Florida.)
- Black marking on the dorsal scales of the red rings. 2

* Snakes of this genus are commonly called Coral snakes.

2. Many irregular black streaks and spots in the red rings.
Micrurus fulvius tenere (Baird and Girard)
(Mississippi, west through Texas to northern Tamaulipas,
Mexico.)
Black markings in red rings tend to form two large spots.
Micrurus fulvius fulvius (Linné)
(North Carolina to Florida; the Gulf States and Mis-
sissippi Valley States north to Ohio and Indiana.)

GENUS *Natrix**

1. Scale rows 19 2
Scale rows more than 19..... 5
2. Lower labials 7; one preocular....*Natrix kirtlandii* (Kennicott)
(Wisconsin and southern Michigan south through north-
ern and central Illinois and Indiana to Louisville, Ken-
tucky, and east throughout Ohio to western Pennsyl-
vania.)
Lower labials 9 to 11; usually 2 preoculars..... 3
3. One long dark median stripe on belly, or no markings except
on the ends of ventrals...*Natrix grahamii* (Baird and Girard)
(Illinois to eastern Kansas and south to Texas and
Louisiana.)
Two long dark stripes near middle of belly, at least anteri-
orly 4
4. Light ventro-lateral stripes present..*Natrix septemvittata* (Say)
(Pennsylvania, Ohio, Michigan, and Wisconsin south to
Alabama, Georgia and northeastern Florida.)
No light ventro-lateral stripes.....*Natrix rigida* (Say)
(South Carolina to western Louisiana, excluding penin-
sular Florida.)
5. Scale rows 27 to 33 (sometimes 25 in *rhombifera*, which has,
however, a pattern of alternating dorsal and lateral spots
connected by diagonal bars); lower labials usually
11 to 13 6
Scale rows 21 to 25 (rarely 27 in *transversa*); lower labials
usually 10 9
6. Two anterior temporals; a mid-dorsal row of 21 to 25 isolated
quadrate spots.....*Natrix taxispilota* (Holbrook)
(Coastal regions from North Carolina to central Florida
and westward possibly to Louisiana.)
One anterior temporal; dorsal spots, if visible, usually con-
nected with lateral spots..... 7

* Adapted from William M. Clay: A Synopsis of the North American Water Snakes; Copeia, 1938, No. 4.

7. No suboculars (upper labials in contact with eye); dorsal spots, 26 to 33. . . . *Natrix rhombifera rhombifera* (Hallowell)
(Southern Indiana and Illinois to Alabama and west to Texas and northern Mexico.)

One or more suboculars; dorsal spots about 50, small and ill-defined 8

8. Ventral surface of posterior two-thirds of body heavily marked with dark brown; 41 to 50 lateral bars; caudals in males less than 80, in females less than 70.

Natrix cyclopion cyclopion (Duméril and Bibron)
(Lowlands of the Mississippi Valley from southern Illinois south to Louisiana, east to northwestern Florida and possibly west along the coast into Texas.)

Ventral surface whitish or yellowish, only slightly marked posteriorly; 49 to 57 lateral bars; caudals in males 80 or more, in females 70 or more. . . *Natrix cyclopion floridana* Goff
(Peninsular Florida, northwest to Tallahassee and northeast along the coast to South Carolina.)

9. A median (sometimes irregular) row of light spots on belly. 10
No median row of light spots on belly. 11

10. Dorsal surface spotted or unicolor, the spots occasionally tending to form longitudinal stripes, especially anteriorly.

Natrix sipedon compressicauda (Kennicott)
(Coast of the southern half of peninsular Florida and adjacent coast of Cuba, mainly in brackish water.)

Dorsal surface with four longitudinal dark stripes.

Natrix sipedon clarkii (Baird and Girard)
(Gulf coast from Levy County, Florida, to San Patricio County, Texas, occurring primarily in brackish water.)

11. Dorsal surface unicolor 12
Dorsal surface with cross-bands or spots. 13

12. Dorsal surface gray; belly yellow to cream, dusky posteriorly, especially tail *Natrix sipedon insularum* Conant and Clay
(Pelee and other islands in the western portion of Lake Erie.)

Dorsal surface uniformly dark brown, reddish brown, or black (or spots faintly visible) in adults; belly yellow or red, immaculate or with dark antero-lateral margins of ventrals, but without definite spots, and tip of tail without markings. . . . *Natrix erythrogaster erythrogaster* (Forster)
(Eastern Texas, eastern Oklahoma and southeastern Kansas eastward throughout the southern states (excluding peninsular Florida) and north to Pennsylvania, Ohio, and extreme southern portions of Michigan and Wisconsin.)

13. Ventral surface immaculate or with dark antero-lateral margins of ventrals; tail immaculate beneath, including tip 14
 Ventral surface with definite markings; tip of tail never immaculate beneath 15
14. Neck region with 1 to 7 cross-bands, followed posteriorly by a median series of spots in alternation with a lateral series; this pattern becomes obsolete and uniformly dark with maturity. Juvenile *Natrix erythrogaster erythrogaster* (Forster) (Eastern Texas, eastern Oklahoma and southeastern Kansas eastward throughout the southern states (excluding peninsular Florida) and north to Pennsylvania, Ohio, and extreme southern portions of Michigan and Wisconsin.) Pattern similar but with 2, 1, or no anterior transverse bands, and not becoming obsolete.
Natrix erythrogaster transversa (Hallowell)
 (Western Missouri and eastern Kansas through western Oklahoma to southeastern New Mexico, east to Ft. Worth and Houston, Texas, and south to Nuevo Leon, Mexico.)
15. Dorsal pattern of 3 to 15 anterior transverse bands, posterior to which a series of median dorsal blotches alternates with a series of lateral spots (rarely a complete series of transverse bands, but then belly has half-moon shaped spots); ventrals 128 to 155..... 16
 Dorsal pattern wholly of transverse bands or rarely with a few alternating spots; ventrals 121 to 143..... 17
16. Usually 3 to 10 (rarely more) anterior transverse bands and a total of more than 30 bands and dorsal spots on body; lateral interspaces narrower than lateral bars.
Natrix sipedon sipedon (Linné)
 (Southern Maine through southern Quebec, southern Ontario, and Wisconsin to eastern Colorado, south to Oklahoma, Tennessee, and northwestern South Carolina.)
 Usually 5 to 15 anterior transverse bands and a total of less than 30 bands and dorsal spots; lateral interspaces wider than lateral bars.....*Natrix sipedon pleuralis* Cope
 (South Carolina westward around the southern extremity of the Appalachian Mountains, Mississippi, Arkansas, and southern Missouri, and northward to southern Illinois and southern Indiana.)
17. Dorsal bands 18 or less.....*Natrix sipedon confluens* Blanchard
 (From the Mississippi River west along the Gulf to central Texas and north to southern Oklahoma, central Arkansas, southeastern Missouri and extreme southern Illinois.)
 Dorsal bands more than 18..... 18

18. Dorsal bands about 24 (19 to 33) ; ventrals usually more than 128; belly with quadrate dark or red spots; sometimes small lateral spots alternate with the transverse bands.

Natrix sipedon fasciata (Linné)

(Coastal region from North Carolina to southeastern Louisiana, excluding peninsular Florida.)

- Dorsal bands about 29 (24 to 35) ; ventrals usually less than 128; belly with reddish or dark anterior borders to ventrals, these often narrowed in center leaving a light area.

Natrix sipedon pictiventris Cope

(Peninsular Florida.)

GENUS *Opheodrys*

1. Scales keeled. Rough green snake. . *Opheodrys aestivus* (Linné)
(Connecticut to Florida, westward to eastern New Mexico; in the Mississippi drainage basin found in the southern portion and northward to Kansas, Illinois and Ohio.)

Scales smooth. Smooth green snake.

Opheodrys vernalis (Harlan)

(Utah, New Mexico, and Texas, northeastward to North Dakota and Illinois, thence eastward through New Jersey and through New England to southern Canada.)

GENUS *Oxybelis*

Oxybelis microphthalmus Barbour and Amaral.

(Desert mountain canyons of Arizona near the international Boundary.)

GENUS *Phyllorhynchus**

- | | |
|--|---|
| 1. Dorsal body blotches (not including tail spots) less than 17. . | 2 |
| Dorsal body blotches (not including tail spots) 17 or more. . | 3 |
2. Ventrals in males, 166 or less; in females, 179 or less.
Caudals in males, 36 or less; in females, 26 or less. Body blotches considerably wider, along the dorsal line, than the interspaces. *Phyllorhynchus browni browni* Stejneger
(Southeastern Pinal County and eastern Pima County, west to Organ Pipe Cactus National Monument, Pima County, Arizona.)
- Ventrals in males, 167 or more; in females, 180 or more.
Caudals in males, 37 or more; in females, 27 or more.
Body blotches little, if any, wider, along the dorsal line, than the interspaces. . *Phyllorhynchus browni lucidus* Klauber
(Northeastern Maricopa County, Arizona.)

* Adapted from L. M. Klauber: Two New Subspecies of *Phyllorhynchus*, the Leaf-nose snake, with notes on the genus. Trans. S. D. Soc. Nat. Hist. Vol. 9, No. 20, April, 1940.

3. Ventrals in males, 168 or more; in females, 179 or more.
Body blotches usually distinctly narrower, along the dorsal line, than the interspaces.
Phyllorhynchus decurtatus perkinsi Klauber
(Deserts of southern California, extreme southern Nevada, western Arizona, northeastern Lower California, and extreme northwestern Sonora, Mexico.)
Ventrals in males, 167 or less; in females, 178 or less. Body blotches usually equal to or wider, along the dorsal line, than the interspaces.
Phyllorhynchus decurtatus nubilus Klauber
(Vicinity of Tucson, Arizona; west central and northwestern Sonora, Mexico.)

GENUS *Pituophis**

1. 2 prefrontals....*Pituophis deppei deppei* (Duméril and Bibron)
(Hays County, Texas, to southern Oaxaca, Mexico.)
More than 2 prefrontals..... 2
2. Rostral penetrating between internasals, conspicuously higher than wide 3
Rostral not, or but slightly, penetrating between internasals, about as high as wide..... 8
3. Dorsal blotches prominent..... 4
Dorsal blotches weak or missing..... 7
4. Dorsal blotches less than 35..*Pituophis melanoleucus* (Daudin)
(Pine barrens of southern New Jersey to South Carolina, west to Tennessee.)
Dorsal blotches 35 or more 5
5. Dorsal coloring white (not yellow) suffused with brown.
Pituophis ruthveni Stull
(Louisiana.)
Dorsal coloring yellow (not white), not suffused with brown 6
6. Apex of rostral narrow and sharp; dorsal blotches 40 to 65.
Pituophis sayi sayi (Schlegel)
(Northern Mexico and Texas north to Indiana, Wisconsin, and Alberta.)
Apex of rostral blunt; dorsal blotches 35 to 55.
Pituophis sayi affinis Hallowell
(Northern Mexico north through New Mexico and Arizona to southern Colorado.)

* Snakes of this genus are commonly called Pine snakes, Bull snakes, and Gopher snakes.

7. Dorsal pattern a suffusion of rusty brown.

Pituophis mugitus Barbour

(Peninsular Florida.)

Uniform black above and below. . . . *Pituophis lödingi* Blanchard
(Southern Alabama.)

8. Dorsal dark blotches much wider than lighter interspaces;
anterior dorsal blotches slightly, if at all, joined to lateral
spots 9

Dorsal dark blotches little, if any, wider than lighter inter-
spaces; dorsal blotches often fused with lateral spots
giving a checkerboard or a banded appearance.

Pituophis catenifer annectens Baird and Girard

(Coast region of southern California and northern Lower
California.)

9. Ventrals usually less than 225.

Pituophis catenifer catenifer (Blainville)

(Los Angeles county north through western California
to British Columbia.)

Ventrals usually more than 225.

Pituophis catenifer deserticola Stejneger

(Southeastern California, Nevada, Utah, western Colo-
rado, Idaho, and eastern parts of Oregon and Washing-
ton; northeastern Lower California.)

GENUS *Rhadinaea*

Rhadinaea flavilata (Cope)

(Eastern North Carolina to Florida, and along the Gulf
coast to central Texas.)

GENUS *Rhinocheilus*

Rhinocheilus lecontei Baird and Girard

(Western Kansas south through western Texas to north-
ern Mexico; westward, as far north as southern Idaho,
to the Pacific and south through California and Lower
California.)

GENUS *Salvadora**

1. Posterior pair of chin-shields in contact or separated by 1
small scale; loreal single.

Salvadora grahamiae grahamiae Baird and Girard

(Southeastern Arizona eastward through New Mexico and
Texas, except the extreme eastern part.)

* Adapted from Charles M. Bogert: The Patch-nosed Snakes; Pub. Univ.
Calif., L. A. Biol. Sci. Vol. 1, No. 10, 1939.

- Posterior pair of chin-shields separated by 2 or 3 small scales; loreals 2 or 3..... 2
2. Top of the head gray, about the color of the light stripe; each of the dark stripes splitting into two stripes on the posterior $\frac{2}{3}$ of the body. *Salvadora grahamiae hexalepis* (Cope) (Southern and western Arizona, southwestern Utah, southern and western Nevada to southeastern California, Lower California and Tiburon Island; and western Mexico.)
- Top of head brown, about the color of the dark stripes; each dark stripe splitting into two stripes on the posterior $\frac{1}{3}$ of the body..... *Salvadora grahamiae virgulata* Bogert (Foothills of southwestern California and northwestern Lower California.)

GENUS *Seminatrix*

Seminatrix pygaea (Cope)
(Cartaret County, North Carolina, southward through the Florida peninsula.)

GENUS *Sistrurus**

1. Upper preocular usually in contact with postnasal; usually 3 upper labials in contact with the pit-border scales; 11 or more dorsal scale rows at center of tail; no red or orange in the inter-blotch spaces on the mid-dorsal line..... 2
- Upper preocular not in contact with postnasal; usually 2 upper labials in contact with pit-border scales; 10 or less dorsal scale rows at center of tail; usually with red or orange between the blotches on the mid-dorsal line..... 3
2. Ventral surface dark, heavily clouded with black blotches, often almost solid black; scale rows usually 25; body blotches usually less than 37. A pattern of square, red-brown, or black blotches on a gray-brown ground; sometimes unicolor black. Massasauga.

Sistrurus catenatus catenatus (Rafinesque)
(Central New York west to eastern Oklahoma.)

Ventral surface mottled or spotted, the dark areas being less extensive than the light; scale rows often 23; body blotches usually more than 36. A pattern of dark red-brown blotches on a gray-brown ground.

Sistrurus catenatus tergeminus (Say)
(Southwestern plains from central Kansas to northern Tamaulipas, Mexico and southeastern Arizona.)

* Adapted from L. M. Klauber; A Key to the Rattlesnakes with Summary of Characteristics; Trans. S. D. Soc. Nat. Hist., Vol. 8, No. 20, 1936.

* Snakes of this genus are commonly called Ground rattlers.

3. Dorsal coloration brown or light-gray; ventral surface cream, moderately flecked with brown or gray; head markings distinct; lateral spots in 1 or 2 series..... 4
Dorsal coloration dark-gray to black; ventral surface white, heavily blotched with dark-brown or black; head markings obscure; lateral spots in 3 series.
Sistrurus miliarius barbouri Gloyd
(The Gulf lowlands from Georgia to Mississippi; Florida.)
4. Dorsal scale rows usually 21; dorsal spots wider than long and with irregular edges; lateral spots usually higher than wide; ventral spots confined to individual plates.
Sistrurus miliarius streckeri Gloyd
(Southern Missouri to Louisiana and west to central Texas.)
Dorsal scale rows usually 23; dorsal spots oval or subcircular, edges even; lateral spots usually round; ventral spots usually occupying two adjacent plates.
Sistrurus miliarius miliarius (Linné)
(North Carolina to central Alabama.)

GENUS *Sonora**

1. Snout normal; abdomen rounded or but slightly angulate; scale rows various 2
Snout distinctly flattened and attenuated; abdomen strongly angulate; scale rows 15-15....*Sonora occipitalis* (Hallowell)
(Southeastern California, southern Nevada, and in southern Arizona as far east as Tucson.)
2. Anterior scale rows 15, rarely 14 or 16; ventral count high.. 3
Anterior scale rows 13, rarely 14; ventral count low, in males 126 to 139, in females 136 to 148.
Sonora taylori (Boulenger)
(Southern Texas and northeastern Mexico.)
3. Scale rows, near anus 15, rarely 14; ventrals in males 134 to 155, in females 140 to 162; caudals in males 39 to 52, in females 31 to 44.....*Sonora episcopa* (Kennicott)
(Central Texas north to southeastern Kansas and southwestern Missouri and west to extreme eastern Colorado and New Mexico.)
Scale rows near anus 14, very rarely 15 or 13; ventrals or caudals running distinctly higher..... 4

* Adapted from William H. Stickel: The Snakes of the Genus *Sonora* in the United States and Lower California; Copeia, 1938, No. 4.

- 4. Ventrals in males 153 to 168, in females 162 to 183; caudals in males 41 to 57, in females 37 to 54..... 5
Ventrals in males 147 to 155, in females 157 to 166; caudals in males 53 to 59, in females 46 to 51.

Sonora semiannulata blanchardi Stickel
(Southwestern Texas and New Mexico, and adjacent Mexico.)
- 5. A regular series of dark cross-bands present..... 6
No series of cross-bands..... 7
- 6. Most of the body bands meeting across the abdomen; lateral scales heavily shaded with gray.

Sonora semiannulata gloydi Stickel
(Lower Sonoran level of the Grand Canyon, Arizona.)

Bands not meeting across abdomen, or only a few so meeting; lateral scales lightly shaded with gray, or not shaded.
Sonora semiannulata semiannulata Baird and Girard
(Arizona, Utah, Nevada; Inyo County, California; Snake River region, Idaho; Sonora, Mexico.)
- 7. A sharp-edged dorsal pink stripe present; stripe contrasting with the bluish-gray to brownish-gray lateral scales.

Sonora miniata linearis Stickel
(Southeastern California, Pershing County, Nevada, and the Cocopah Mountains, Lower California.)

Dorsal pink stripe absent or blending gradually with the grayish to reddish color of the sides.
Sonora miniata miniata Stickel
(South central Arizona and Ada County, Idaho.)

GENUS *Stilosoma*

Stilosoma extenuatum Brown
(Central Florida.)

GENUS *Storeria*

- 1. 17 scale rows*Storeria dekayi* (Holbrook)
(Eastern North America, Ontario to Vera Cruz, Mexico, west to Kansas.)
15 scale rows 2
- 2. Ventral surface reddish without spots; ventrals less than 135.....*Storeria occipitomaculata* (Storer)
(From Ontario and Lake Superior southward to Vera Cruz, Mexico, westward to Kansas, Iowa, and North Dakota, and southeastward through Alabama and Georgia into northern Florida.)
Ventral surface pale with a row of black dots along each side; ventrals more than 135.....*Storeria victa* Hay
(Florida and southern Georgia.)

GENUS *Tantilla**

1. A light band on back of head crossing tips of parietals..... 2
A light band on back of head crossing behind parietals, or
absent 4
2. A dark band, bordering light band posteriorly, broad (two
to four scale lengths in width) ; eye small, its diameter less
than half its distance from snout; ventrals less than 149.. 3
A dark band, bordering light band, narrow (one-half to one
and one-half scale lengths in width) eye large, its diameter
more than half its distance from snout; ventrals 149 or
more.....*Tantilla wilcoxi* Stejneger
(Huachuca Mountains, Arizona.)
3. Ventrals in males more than 130; in females 139 to 148;
light band on back of head well defined although often
interrupted on the mid-line.
Tantilla coronata coronata Baird and Girard
(South Carolina to southeastern Louisiana, north into
western Kentucky.)
Ventrals in males less than 130; in females 123 to 145; light
band on back of head usually more or less obliterated.
Tantilla coronata wagneri (Jan)
(Peninsular Florida.)
4. Upper labials usually seven (the sixth approximately as
long as the fifth) ; postoculars usually two, rarely single;
head black or dark brown above, contrasting with the gen-
eral dorsal color..... 5
Upper labials usually six (when seven, the sixth usually much
shorter than the fifth) ; rarely more than one postocular;
head usually but little darker than the body color above.
Tantilla gracilis Baird and Girard
(Missouri and southeastern Kansas to eastern Texas.)
5. Black of head extending three to five scale lengths behind
parietal suture, not bordered behind with a narrow white
band; mental plate usually separated from chin-shields
by first lower labials..... 6
Black of head usually extending only one or two scale lengths
behind parietal suture, usually bordered behind with a
narrow white band; mental plate usually in contact with
chin-shields 8
6. Black of head very convex or even pointed behind in the
median line, not extending laterally on the last two upper
labials nor reaching nearly or quite to the mouth line below
the eyes 7

* Adapted from Frank N. Blanchard: Field Mus. Chicago, Zool. Ser., Vol. 20, No. 28, 1938.

Black of head straight across posteriorly, extending laterally on one or both last two upper labials, and reaching nearly or quite to the mouth line below the eyes.

Tantilla coronata wagneri (Jan)

(Peninsular Florida.)

7. Ventrals less than 145.....*Tantilla kirnia* Blanchard
(Comanche County, Oklahoma, southward through Texas nearly to Brownsville, westward to San Antonio.)

Ventrals more than 145.....*Tantilla nigriceps* Kennicott
(Western Kansas and eastern Colorado southward through Oklahoma to Texas, New Mexico and southern Arizona.)

8. Black of head extending below angle of mouth onto gular scales*Tantilla eiseni* Stejneger
(Fresno County, California, to northern part of Lower California.)

Black of head not extending below angle of mouth onto gular scales 9

9. Ventrals in males less than 150, in females less than 160.
Tantilla atriceps (Günther)
(Oklahoma, western Texas, New Mexico, southeastern Arizona to northern Mexico.)

Ventrals in males more than 150, in females more than 160.
Tantilla utahensis Blanchard
(Southwestern Utah and west into Sierra Nevada in California.)

GENUS *Thamnophis**

1. Lateral stripe anteriorly on 3rd and 4th rows of scales..... 2
Lateral stripe anteriorly not on 4th row of scales or absent... 7
2. Tail usually more than 0.27 of total length..... 3
Tail usually less than 0.27 of total length..... 5
3. Upper labials usually 7..*Thamnophis sauritus sauritus* (Linné)
(Michigan, Ontario, and Maine, south to Mississippi, Alabama and Georgia.)
Upper labials usually 8..... 4

4. Dorsal stripe present throughout.
Thamnophis sauritus proximus (Say)
(Northern Iowa and southern Wisconsin, west to western Nebraska and southeastern Colorado and south through Texas and Louisiana to Costa Rica.)

Dorsal stripe absent, or present only behind the head.
Thamnophis sauritus sackenii (Kennicott)
(Throughout Florida to southern Mississippi.)

*The *ordinoides* group and the Pacific Coast subspecies of *sirtalis* are adapted from a forthcoming publication by Henry S. Fitch.

*Snakes of this genus are commonly called Garter snakes and Ribbon snakes.

5. Scale formula usually 21-19-17; upper labials 8 (occasionally 9).....*Thamnophis megalops* (Kennicott)
(Mexico north to Texas, southwestern New Mexico and Arizona, and the Cocopah Mountains, Lower California.)
Scale formula usually lower than 21-19-17; upper labials usually less than 8..... 6
6. Scale formula usually 19-21-19-17; upper labials usually 7
Thamnophis radix (Baird and Girard)
(The Great Plains from Missouri to the Canadian Northwest.)
Scale formula usually 19-17; upper labials 6 or 7.
Thamnophis butleri (Cope)
(Extreme western New York, and southwestern Ontario; western Pennsylvania, through Ohio and Indiana, southern Michigan and Wisconsin.)
7. Lateral stripe anteriorly on 2nd and 3rd rows of scales, or absent 8
Lateral stripe on 3rd row of scales only.
Thamnophis marcianus (Baird and Girard)
(Kansas, Oklahoma and Texas west to southeastern California and northwestern Mexico.)
8. 7 upper labials 9
8 upper labials 15
9. Ventrals usually more than 153; dorsal stripe bright yellow; no pale dorsolateral flecks; posterior chin-shields markedly longer than anterior..... 10
Ventrals usually less than 153; dorsal stripe yellow or red; pale yellowish flecks between scales in area between dorsal and lateral stripes; posterior chin-shield but little longer than anterior.
Thamnophis ordinoides ordinoides (Baird and Girard)
(Coast region of northern California to British Columbia.)
10. Both rows of lateral spots distinct on the skin; interspaces not usually red.....*Thamnophis sirtalis sirtalis* (Linné)
(Eastern United States and Canada west to Minnesota, Wisconsin, Missouri, southward to eastern Texas.)
Upper row of lateral spots fused on the skin; interspaces usually red 11
11. Ground color jet black obscuring dorsal spots and extending onto ventral surface; stripes narrow and sharply defined, or occasionally with lateral stripes entirely obscured in melanistic individuals..... 12
Ground color paler, slaty or brownish, with little or no black on ventral surface except at tips of ventrals..... 13

12. Head red; dorsal stripe one and two half scales wide.
Thamnophis sirtalis concinnus (Hallowell)
(Northwestern Oregon.)
Head dark colored with no reddish suffusion; dorsal stripe
nearly confined to mid-dorsal row.
Thamnophis sirtalis pickeringii (Baird and Girard)
(Western Washington.)
13. Ground color sufficiently dark to obscure dorsal spots; top
of head mainly black. . . *Thamnophis sirtalis tetrataenia* (Cope)
(California except immediate coastal region as far south
as the southern end of the San Joaquin Valley; eastern
parts of Oregon and Washington; Idaho and western
Nevada.)
Ground color paler, not entirely obscuring dorsal spots; top
of head mostly olive. 14
14. Stripes broader, duller colored.
Thamnophis sirtalis parietalis (Say)
(Iowa and Minnesota, Missouri westward to Utah, eastern
Nevada, southern Idaho; southern Alberta and Manitoba,
Canada.)
Stripes narrower and bright yellow.
Thamnophis sirtalis infernalis (Blainville)
(Coastal strip of California from Humboldt County to
northern San Diego County.)
15. Dorsal stripe bright yellow and well developed. 16
Dorsal stripe faint, discontinuous, or absent. 19
16. 2 preoculars on one or both sides; scale rows 21, 22, or 23
when counted at a point one-third of the distance from
head back to anus.
Thamnophis ordinoides biscutatus (Cope)
(Southern Oregon and northern California in the drain-
age basins of the Klamath, Tule and Goose lakes.)
1 preocular; scale rows 19, 20, or 21 when counted at a point
one-third of the distance from head back to anus. 17
17. Red markings often present on sides or on ventral surface;
lateral stripes sometimes red; head narrow; ventrals
usually less than 160.
Thamnophis ordinoides atratus (Kennicott)
(Coast region of northern California south to Santa Bar-
bara County.)
No red in coloration; head wide and swollen; ventrals usually
more than 160 18

18. 19 scale rows; ground color of dorsolateral area brown; on each side two series of conspicuous dark spots which may invade the dorsal or lateral stripes; posterior chin-shields markedly longer than anterior.... *Thamnophis eques* (Reuss) (Utah, Arizona, New Mexico and Texas, southward to Guatemala.)

- 21 (occasionally 20 or 19) scale rows; ground color of dorsolateral area nearly black, sufficiently dark nearly to obscure superimposed dark spots; posterior chin-shields not much longer than anterior.

Thamnophis ordinoides elegans (Baird and Girard)
(Southwestern Oregon, northern California, Sierra Nevada slopes of Nevada and California and in the San Bernardino Mountains.)

19. Dorsal stripe absent..... 22

- Dorsal stripe present but faint or confined to the anterior part of body..... 20

20. Dorsal stripe visible for full length of body, but faint, irregular or invaded by small, rounded dorsal spots; iris dark brown with narrow yellow rim around pupil.

Thamnophis ordinoides vagrans (Baird and Girard)
(Coastal region of British Columbia and Washington, and high Sierra Nevada of California, eastward to Alberta, Canada, South Dakota and Oklahoma.)

- Dorsal stripe faint, usually confined to anterior part of body; dorsal surface checkered with large square-shaped markings; iris uniformly brown or gray..... 21

21. 21 scale rows, both in neck region and middle of body; dorsal stripe often confined to neck region.

Thamnophis ordinoides couchii (Kennicott)
(Sacramento and San Joaquin Valleys in California, eastward over the Sierra Nevada into Douglas and Washoe Counties, Nevada.)

- 19 scale rows, either in neck region, or middle of body, or both; dorsal stripe discernible at least on anterior half of body..... *Thamnophis ordinoides hydrophila* Fitch
(Southwestern Oregon and northwestern California, from the Umpqua River in the north to the Gualala River in the south; east to the Shasta River and the Sacramento Valley.)

22. Lateral stripe well developed; dorsal spots small and inconspicuous..... *Thamnophis hammondi* (Kennicott)
(Southwestern California and adjacent Lower California.)

Lateral stripe usually absent; dorsal spots numerous and prominent.....*Thamnophis angustirostris* (Kennicott)
(Southeastern Arizona and southwestern New Mexico south to Coahuila and Durango, Mexico.)

GENUS *Trimorphodon**

1. Pattern consists of dark cross-bands, much narrower than the interspaces.....*Trimorphodon vilkinsonii* Cope
(Extreme western Texas and Chihuahua, Mexico.)

Pattern of dark blotches (each split by a light transverse line) equal to or greater in width than the interspaces.... 2

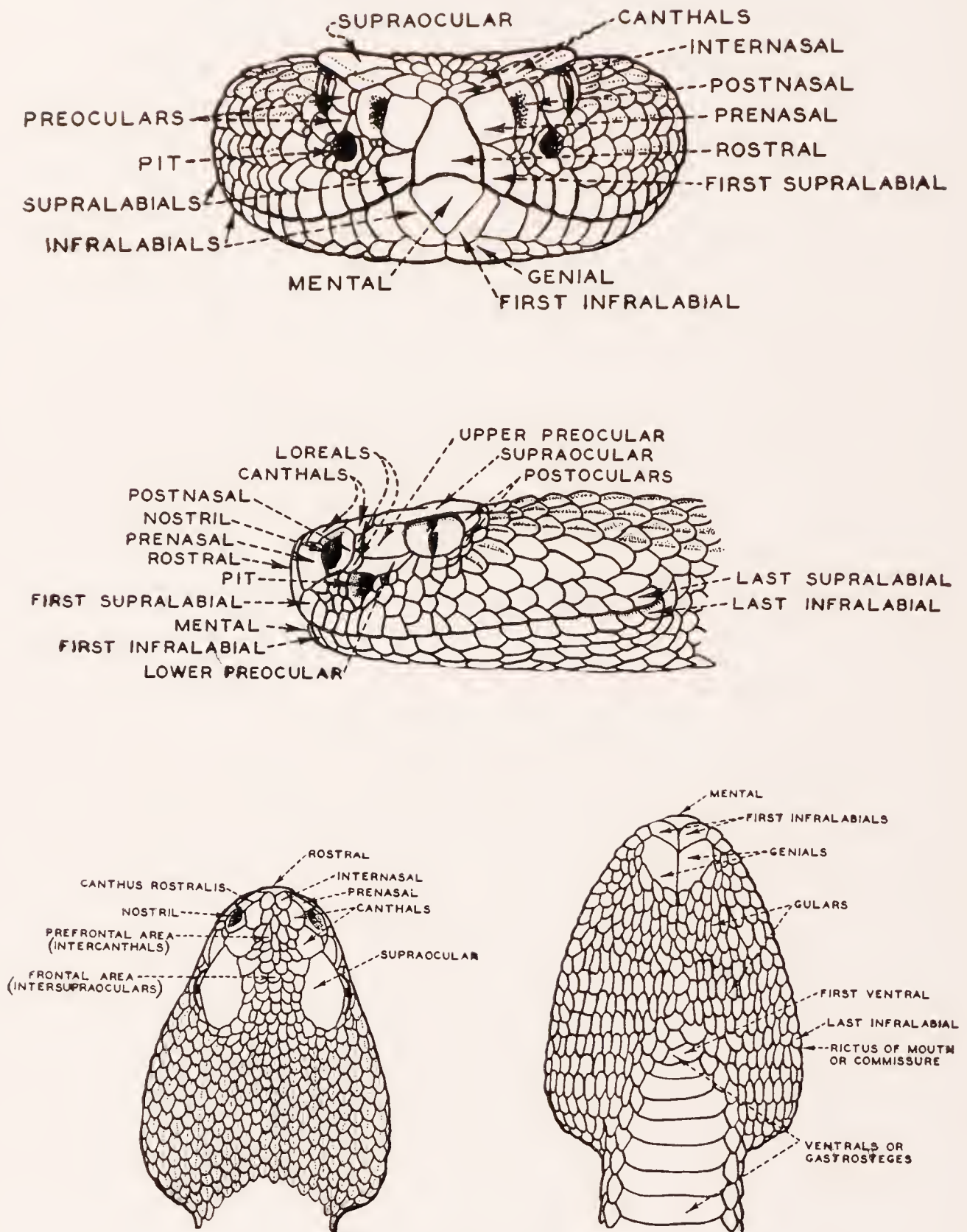
2. Anal plate almost always divided; blotches 21 to 34.
Trimorphodon lyrophanes (Cope)
(Southwestern Utah, Arizona, southern Nevada, southeastern California, central and southern Lower California and northwestern Mexico.)

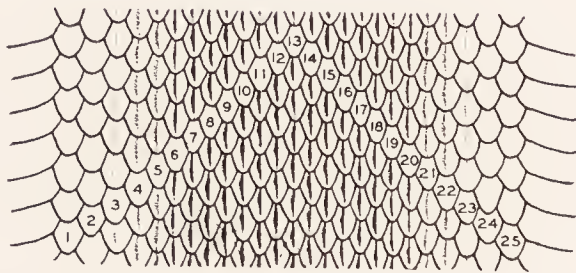
Anal plate almost never divided; blotches 28 to 43.
Trimorphodon vandenburghi Klauber
(Los Angeles and Inyo Counties south throughout California to the Mexican border, but not including the country adjacent to the Colorado River.)

GENUS *Tropidoclonion*

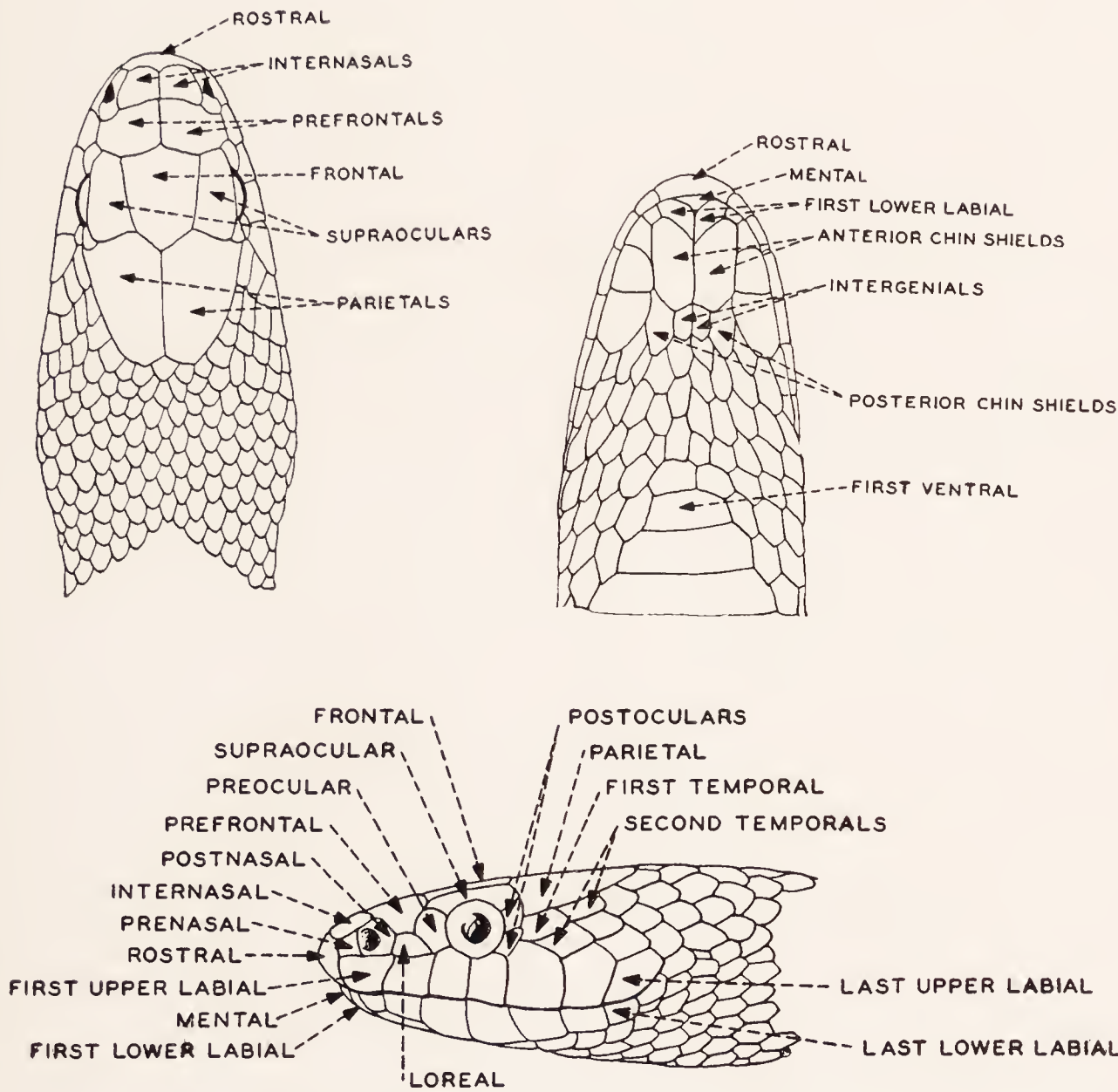
Tropidoclonion lineatum (Hallowell)
(Ohio to Iowa and southeastern South Dakota and through Missouri, Kansas, and Arkansas to Oklahoma and Texas.)

* Adapted from L. M. Klauber: The Lyre Snakes (Genus *Trimorphodon*) of the United States. Trans. S. D. Soc. Nat. Hist. Vol. 9, No. 19. April, 1940.

Nomenclature of head scales—(*Crotalus*)



Method of counting dorsal scale rows.



Nomenclature of head scales—(*Lampropeltis*)

GLOSSARY

Anal plate.—The scale covering the anus; it may be either one large scale or divided into two scales by a diagonal or longitudinal slit.

Apical scale-pits.—A pair (single in some snakes) of depressions faintly evident on the posterior end of each scale; usually most evident dorsally near the tail.

Azygous scale.—A small plate behind the rostral, between the internasals.

Body.—From head to anus.

Body blotches.—These are counted from the posterior edge of the head to the anus. On the sides there are usually additional series of smaller blotches known as lateral or secondary blotches, often in several rows, one below the other. In many snakes, especially on the posterior half or third of the body, the main dorsal blotches merge with the laterals to form cross-bars or rings.

Canthals.—In some snakes, the border scales of the crown between the internasals and the supraoculars.

Canthus rostralis.—The outer edge of the flat area of the crown where it turns downward on the side, extending from the rostral to the supraocular.

Caudals.—Large scales on the under-tail; in either two or one series. In the case of divided caudals each pair is counted as one. Also referred to as subcaudals or urosteges.

Chin-shields.—Usually two pairs (anterior and posterior) of enlarged scales under the head between the two rows of lower labials.

Frontal.—A large median plate on the top of the head between the supraoculars. In some snakes this space is filled with scales more or less irregularly disposed and is referred to as the frontal area, and the scales as the intersupraoculars.

Gastrosteges.—See ventrals.

Genials.—See Chin-shields.

Gulars.—The small scales covering the underside of the head between the two rows of lower labials and not otherwise specifically named.

Head length.—The distance measured from the tip of the rostral to a line joining the posterior tips of the mandibular bones.

Infralabials.—See labials, lower.

Intercanthals.—In some snakes, the small irregularly disposed scales occupying the space anterior to the frontal area and between the canthals.

Intergenials.—Small scales between the chin-shields.

Internasals.—Usually two plates, in some snakes one, on top of the head just behind the rostral. In some rattlesnakes, three or more.

Intersupraoculars.—See frontal.

Keel.—A median longitudinal ridge on a scale.

Labials, Lower.—Lip plates along the lower jaw on each side, separated in front by the mental.

Labials, Upper. — Lip plates along the upper jaw on each side, separated in front by the rostral.

Length. — The length over-all (or body length) is measured from the tip of the rostral to the end of the tail; in the rattlers, to the forward edge of the proximal rattle.

Loreal. — One or more small scales between the preoculars and nasal. In case there are no preoculars, an elongated scale between the eye and the nasal.

Mental. — The plate at the extreme anterior point of lower jaw.

Nasal. — If the nostril is in the center of a large scale, this scale is called the nasal. If the nostril lies between two scales, these are called the anterior and posterior nasal, or prenasal and postnasal.

Parietals. — Paired large plates behind the frontal.

Pit. — A deep depression on the side of the head below and behind the nostril and in front of the eye. Where pit-border scales are mentioned, those constituting the internal rim are meant, rather than those which are completely external to the pit. The pit is present only in the so-called pit vipers; represented in the United States by the rattlesnakes, copperheads and cotton-mouth moccasin.

Postnasal. — See nasal.

Postocular. — One or more small scales bordering the eye posteriorly.

Postrostral. — See azygous scale.

Prefrontals. — Paired (sometimes three or more) large plates immediately anterior to the frontal.

Prenasal. — See nasal.

Preocular. — One or more small scales bordering the eye in front. If such a scale is much longer than high and there is only one between the postnasal and eye, it is called a loreal, in which case the preocular is absent.

Rattle. — The proximal rattle (or segment) is that next the tail. The button is the first permanent segment acquired by a baby rattlesnake; the pre-button or segment present at birth is invariably lost with the first exuviation.

Rostral. — The plate at the extreme anterior point of snout.

Scale formula. — A series of numbers representing the number of scale rows counted at different places on the body. Three numbers, say 17-19-15, would mean 17 scale rows at the anterior portion of the body, about a head length behind the head, a maximum of 19 scale rows near the middle of the body, and 15 scale rows at the posterior end a short distance anterior to the anus. A higher formula would mean more scale rows and a lower formula would mean less scale rows.

Scale rows. — The number of rows of dorsal scales starting the count on the first row above the ventrals and continuing to the ventrals on the other side. Unless otherwise stated, the maximum number is given and can best be taken a little anterior to the middle of the body.

Sex. — Dissection of under portion of tail, just posterior to the anus, will show, in a male, two organs (the hemipenes) and two scent glands; in the female the scent glands only will be shown. A male usually has a longer tail with a gradual taper, while a female has a shorter tail with a noticeable constriction at the anus.

Subcaudals. — See caudals.

Suboculars. — In some snakes, small scales between the eye and the upper labials.

Supralabials. — See labials, upper. In *Leptotyphlops* the supralabials are named as follows: (1) nasal (or inferior nasal, if the nasal be divided); (2) anterior supralabial; (3) ocular; (4) posterior supralabial. The anterior supralabial may be split vertically.

Supraoculars. — Large scales above the eyes.

Suture. — A division between two scales or plates, or the parts of a plate.

Tail length. — Distance from anus to tip of tail. In rattlesnakes from anus to proximal rattle.

Tail rings or blotches. — The dorsal rings or blotches between the anus and the tip of the tail or proximal rattle.

Temporals. — Anterior temporals are large scales, one above the other, behind the postoculars and between the parietals and upper labials. Posterior temporals are similar scales behind the anterior temporals.

Urosteges. — See caudals.

Ventrals. — Large scales, transversely elongated, on the under surface from the under side of the head to the anal plate. To count the ventrals begin with the first scale that is transversely elongated and end with the scale anterior to the anal plate. Also referred to as gastrosteges.

INDEX

- abacura, *Farancia abacura*, 33
- Abastor, 21, 16, 20, 6
- abyssus, *Crotalus viridis*, 27
- adamanteus, *Crotalus*, 28
- aestivus, *Ophedrys*, 44
- affinis, *Pituophis sayi*, 45
- Agkistrodon, 21, 14, 11
- alleni, *Liodytes*, 40
- alerna, *Lampropeltis*, 35
- amabilis, *Diadophis amabilis*, 31
- amaura, *Lampropeltis*
 triangulum, 37, 38
- amoena, *Carphophis amoena*, 22
- angustirostris, *Thamnophis*, 55
- annectens, *Pituophis catenifer*, 46
- annulata *Lampropeltis triangulum*, 37
- Arizona, 22, 18, 7
- arizonae, *Diadophis regalis*, 30
- arnyi, *Diadophis punctatus*, 30
- atratus, *Thamnophis ordinoides*, 53
- atricaudatus, *Crotalus horridus*, 29
- atriceps, *Tantilla*, 51
- atrox, *Crotalus*, 27
- bairdi, *Elaphe*, 32
- barboursi, *Micrurus fulvius*, 40
- barboursi, *Sistrurus miliarius*, 48
- biscutatus, *Thamnophis ordinoides*, 53
- blanchardi, *Sonora semiannulata*, 49
- bottae, *Charina*, 22
- boylii, *Lampropeltis getulus*, 36
- brooksi, *Lampropeltis getulus*, 36
- browni, *Heterodon contortrix*, 34
- browni, *Phyllorhynchus browni*, 44
- Bull snake, 45
- butleri, *Thamnophis*, 52
- cahuilae, *Leptotyphlops humilis*, 40
- California boa, 40
- californiae, *Lampropeltis getulus*, 36
- calligaster, *Lampropeltis*, 37
- cana, *Ficimia*, 33
- Carphophis*, 22, 18, 6
- catenatus, *Sistrurus catenatus*, 47
- catenifer, *Pituophis catenifer*, 46
- Cemophora*, 22, 18, 8
- cerastes, *Crotalus*, 25
- Charina*, 22, 15, 6
- Chicken snake, 32
- Chilomeniscus*, 23, 19, 9
- chlorosoma, *Elaphe*, 32
- cinctus, *Chilomeniscus*, 23
- clarkii, *Natrix sipedon*, 42
- coccinea, *Cemophora*, 22
- Coluber*, 23, 18, 7
- compressicauda, *Natrix sipedon*, 42
- concinus, *Thamnophis sirtalis*, 53
- confinis, *Elaphe obsoleta*, 33
- confluens, *Natrix sipedon*, 43
- Coniophanes, 25, 20, 10
- constrictor, *Coluber constrictor*, 23
- Contia, 25, 19, 8
- contortrix, *Heterodon contortrix*, 34
- Copperhead, 21
- Coral snake, 40
- Corn snake, 32
- coronata, *Tantilla coronata*, 50
- Cotton mouth, 21
- couchii, *Thamnophis ordinoides*, 54
- couperi, *Drymarchon corais*, 31
- Crotalus*, 25, 15, 12
- cupreus, *Agkistrodon mokasen*, 21
- cyclopion, *Natrix cyclopion*, 42
- deckerti, *Elaphe quadrivittata*, 33
- decolor, *Crotalus viridis*, 27
- dekayi, *Storeria*, 49
- deppei, *Pituophis deppei*, 45
- Desert boa, 40
- deserticola, *Pituophis catenifer*, 46
- Diadophis*, 29, 18, 6
- dissectus, *Leptotyphlops dulcis*, 39
- Drymarchon*, 31, 18, 7
- Drymobius*, 32, 17, 7
- dulcis*, *Leptotyphlops dulcis*, 39
- edwardsii, *Diadophis punctatus*, 30
- eiseni, *Tantilla*, 51
- Elaphe*, 32, 17, 20, 7
- elapsoides, *Lampropeltis elapsoides*, 38
- elegans, *Arizona elegans*, 22
- elegans, *Haldea valeriae*, 34
- elegans, *Thamnophis ordinoides*, 54
- episcopa, *Sonora*, 48
- eques, *Thamnophis*, 54
- erythrogaster, *Natrix*
 erythrogaster, 42, 43
- erythrogrammus, *Abastor*, 21
- euryxanthus, *Micruroides*, 40
- extenuatum, *Stilosoma*, 49
- Farancia*, 33, 16, 20, 6
- fasciata, *Natrix sipedon*, 44
- Ficimia*, 33, 19, 9
- flagellum, *Coluber flagellum*, 24, 25
- flavigularis, *Coluber flagellum*, 24, 25
- flavilata, *Rhadinaea*, 46
- flaviventris, *Coluber constrictor*, 23
- floridana, *Lampropeltis getulus*, 36
- floridana, *Natrix cyclopion*, 42
- Fox snake, 32
- frenatum, *Coluber flagellum*, 24
- fulvius, *Micrurus fulvius*, 41
- Garter snake, 51
- gentilis, *Lampropeltis triangulum*, 38
- getulus, *Lampropeltis getulus*, 36

- girardi, *Coluber taeniatus*, 24
 gloydi, *Sonora semiannulata*, 49
 Gopher snake, 45, 31
 gracia, *Lichanura roseofusca*, 40
 gracilis, *Tantilla*, 50
 grahamiae, *Salvadora grahamiae*, 46
 grahamii, *Natrix*, 41
 Green snake, 44
 Ground rattler, 47
 guttata, *Elaphe*, 32
 Haldea, 34, 16, 17, 18, 9
 hammondii, *Thamnophis*, 54
 helenae, *Carphophis amoenae*, 22
 Heterodon, 34, 16, 6
 hexalepis, *Salvadora grahamiae*, 47
 Hog-nose snake, 34
 holbrooki, *Lampropeltis getulus*, 35
 Horn snake, 33
 horridus, *Crotalus horridus*, 29
 humilis, *Leptotyphlops humilis*, 40
 hydrophila, *Thamnophis ordinoides*, 54
 Hypsiglena, 35, 20, 10
 imperialis, *Coniophanes imperialis*, 25
 Indigo snake, 31
 infernalis, *Thamnophis sirtalis*, 53
 insularum, *Natrix sipedon*, 42
 kennerlyi, *Heterodon nasicus*, 34
 King snake, 35
 kirnia, *Tantilla*, 51
 kirtlandii, *Natrix*, 41
 klauberi, *Crotalus lepidus*, 26
 laeta, *Elaphe*, 32
 Lampropeltis, 35, 18, 8
 lateralis, *Coluber*, 24
 laticinctus, *Agkistrodon mokasen*, 21
 Leaf-nosed snake, 44
 lecontei, *Rhinocheilus*, 46
 lepidus, *Crotalus lepidus*, 26
 Leptodeira, 39, 20, 10
 Leptotyphlops, 39, 14, 6
 Lichanura, 40, 15, 6
 linearis, *Sonora miniata*, 49
 lineatum, *Tropidoclonion*, 55
 Liodytes, 40, 16, 10
 lödingi, *Pituophis*, 46
 lucidus, *Phyllorhynchus browni*, 44
 lutosus, *Crotalus viridis*, 28
 Lyre snake, 55
 lyrophanes, *Trimorphodon*, 55
 marcianus, *Thamnophis*, 52
 margaritiferus, *Drymobius*, 32
 Massasauga, 47
 megalops, *Thamnophis*, 52
 melanoleucus, *Pituophis*, 45
 melanurus, *Drymarchon corais*, 31
 microphthalmus, *Oxybelis*, 44
 Micruroides, 40, 19, 11
 Micrurus, 40, 19, 11
 miliarius, *Sistrurus miliarius*, 48
 Milk snake, 35
 miniata, *Sonora miniata*, 49
 modestus, *Diadophis amabilis*, 30
 mokasen, *Agkistrodon mokasen*, 21
 molossus, *Crotalus molossus*, 29
 mormon, *Coluber constrictor*, 23
 mugitus, *Pituophis*, 46
 multicincta, *Lampropeltis*, 37
 nasicus, *Heterodon nasicus*, 34
 Natrix, 41, 17, 9
 nigra, *Lampropeltis getulus*, 35
 nigriceps, *Tantilla*, 51
 nubilus, *Phyllorhynchus decurtatus*, 45
 nuntius, *Crotalus viridis*, 27
 obsoleta, *Elaphe obsoleta*, 33
 occidentalis, *Arizona elegans*, 22
 occidentalis, *Diadophis amabilis*, 31
 occipitalis, *Sonora*, 48
 occipitomaculata, *Storeria*, 49
 ochrorhynchus, *Hypsiglena*, 35
 Opheodrys, 44, 17, 18, 7
 ordinoides, *Thamnophis ordinoides*, 52
 oreganus, *Crotalus viridis*, 28
 Oxybelis, 44, 19, 10
 parietalis, *Thamnophis sirtalis*, 53
 Patch-nosed snake, 46
 perkinsi, *Phyllorhynchus decurtatus*, 45
 Phyllorhynchus, 44, 17, 18, 7
 piceus, *Coluber*, 24
 pickeringii, *Thamnophis sirtalis*, 53
 pictiventris, *Natrix sipedon*, 44
 Pilot black snake, 33
 Pine snake, 45
 piscivorus, *Agkistrodon*, 21
 Pituophis, 45, 17, 8
 pleuralis, *Natrix sipedon*, 43
 priapus, *Coluber constrictor*, 23
 pricei, *Crotalus triseriatus*, 29
 proximus, *Thamnophis sauritus*, 51
 pulchellus, *Diadophis amabilis*, 31
 punctatus, *Diadophis punctatus*, 30
 pygaea, *Seminatrix*, 47
 pyromelana, *Lampropeltis*, 37
 pyrrhus, *Crotalus mitchellii*, 26
 quadrivittata, *Elaphe quadrivittata*, 33
 Racer, 23
 radix, *Thamnophis*, 52
 Rainbow snake, 21
 Rat snake, 32
 Rattlesnake, 25, 47
 regalis, *Diadophis regalis*, 30
 reinwardtii, *Farancia abacura*, 33

- Rhadinaea, 46, 19, 6
 Rhinocheilus, 46, 17, 8
 rhombifera, *Natrix rhombifera*, 42
 rhombomaculata, *Lampropeltis*, 37
 Ribbon snake, 51
 rigida, *Natrix*, 41
 Ring-neck snake, 29
 rosacea, *Elaphe*, 32
 roseofusca, *Lichanura roseofusca*, 40
 Rough green snake, 44
 Rubber snake, 22
 ruber, *Crotalus*, 27
 ruthveni, *Coluber taeniatus*, 24
 ruthveni, *Pituophis*, 45
 sackenii, *Thamnophis sauritus*, 51
 Salvadora, 46, 18, 7
 sauritus, *Thamnophis sauritus*, 51
 sayi, *Pituophis sayi*, 45
 schotti, *Coluber taeniatus*, 24
 scutulatus, *Crotalus scutulatus*, 27, 29
 segregus, *Leptotyphlops humilis*, 39
 semiannulata, *Sonora semiannulata*, 49
 semilineatus, *Coluber*, 24
 Seminatrix, 47, 17, 19, 9
 septemvittata, *Natrix*, 41
 septentrionalis, *Leptodeira septentrionalis*, 39
 Sidewinder, 25
 similis, *Diadophis amabilis*, 31
 simus, *Heterodon*, 34
 sipedon, *Natrix sipedon*, 43
 sirtalis, *Thamnophis sirtalis*, 52
 Sistrurus, 47, 14, 11
 Smooth green snake, 44
 Sonora, 48, 19, 9
 splendida, *Lampropeltis getulus*, 35
 Spreading adder, 34
 stephensi, *Crotalus mitchellii*, 28
 stictogenys, *Diadophis punctatus*, 30
 Stilosoma, 49, 18, 8
 Storeria, 49, 16, 9
 streckeri, *Ficimia*, 33
 streckeri, *Sistrurus miliarius*, 48
 striatula, *Haldea*, 34
 subocularis, *Elaphe*, 32
 syspila, *Lampropeltis triangulum*, 39
 taeniatus, *Coluber taeniatus*, 24
 Tantilla, 50, 19, 11
 taxispilota, *Natrix*, 41
 taylori, *Sonora*, 48
 tenere, *Micrurus fulvius*, 41
 tenuis, *Contia*, 25
 tergeminus, *Sistrurus catenatus*, 47
 tetrataenia, *Thamnophis sirtalis*, 53
Thamnophis, 51, 17, 10
 tigris, *Crotalus*, 28
 transversa, *Natrix erythrogaster*, 43
 triangulum, *Lampropeltis triangulum*, 38
 Trimorphodon, 55, 18, 20, 10
 Tropidoclonion, 55, 17, 10
 utahensis, *Leptotyphlops humilis*, 39
 utahensis, *Tantilla*, 51
 vagrans, *Thamnophis ordinoides*, 54
 valeriae, *Haldea valeriae*, 34
 vandenburghi, *Diadophis amabilis*, 31
 vandenburghi, *Trimorphodon*, 55
 vermis, *Carphophis amoena*, 22
 vernalis, *Opheodrys*, 44
 victa, *Storeria*, 49
 wilkinsonii, *Trimorphodon*, 55
 virginiana, *Lampropeltis elapsoides*, 38
 virgultea, *Salvadora grahamiae*, 47
 viridis, *Crotalus viridis*, 27
 vulpina, *Elaphe*, 32
 wagneri, *Tantilla coronata*, 50, 51
 Water moccasin, 21
 Water snake, 41
 Whip snake, 23
 wilcoxi, *Tantilla*, 50
 willardi, *Crotalus*, 25
 Worm snake, 39, 22
 yumensis, *Lampropeltis getulus*, 36

